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THE BREATH OF LIFE

PRESIDENTIAL ADDRESS

JONATHAN C. MEAKINS, M.D.

MONTREAL

The text of my address will be found in the Holy Writ in the second chapter of Genesis and the seventh verse, where it saith "And the Lord God formed man of the dust of the ground and breathed into his nostrils the breath of life; and man became a living soul." But in Flavius Josephus we read in the second paragraph of the first book that "God took dust from the ground and formed man and inserted in him a spirit and a soul." So here we see that there is apparently a close affinity between life, the spirit and soul. Already we find in the first chapters of Genesis that God had already commanded the waters to bring forth abundantly every moving creature that hath life and fowl that may fly above the earth in the open firmament of heaven. And He created great whales and every living creature that moveth, and let the earth bring forth the living creatures, and made the beast of the earth after his kind and cattle after their kind and everything that creepeth upon the earth after his kind: He commanded them to reproduce each after their kind; so having provided for the future of man "He breathed into him the breath of life" and made him a living soul.

This beautifully allegorical account of the Creation cannot but move us to admiration of the perfect historian who in a few clear-cut sentences outlines for those who follow after his conception of the beginning and way of life. But it must be noted that to man only was there given something of a special nature—all animal life was commanded to live, to reproduce, but the breath of life gave to man a soul.

A somewhat more comprehensive interpretation of the breath of life is undoubtedly to be found in ancient writings; but, to keep to the Holy Writ, we find written in the fifth chapter of II Kings and the 34th and 35th verses how Elisha resuscitated the son of the Shunammite:

> He went up, and lay upon the child, and *put his mouth* upon his mouth and his eyes upon his eyes, and his hands upon his hands: and he stretched himself upon the child; and the flesh of the child waxed warm.
>
> Then he returned, and walked to and fro: and went up, and stretched himself upon him, and the child sneezed seven times, and the child opened his eyes.

This is the first recorded resuscitation by direct artificial respiration: the transference of the breath of life or the spirit of the soul of man from the holy prophet to the son of the Shunammite woman.

"Man does not live by bread alone." The members of the animal kingdom carry within themselves stores of most of their requirements, such as water, salts and food in the ordinary sense; but they have no stores of oxygen, without which life becomes extinct. In their development through the eons of time it seems strange that for this substance of imperative need there has been no mechanism evolved whereby a reserve might be accumulated. Even in those species which have a constant aqueous environment the acquisition of oxygen is a matter of the moment and is proceeded with incessantly to meet the continuous demands.

RESPIRATORY MECHANISMS

Respiration is commonly restricted to the intake of oxygen and the elimination of carbon dioxide by the lungs or their analogue. In a general way this is similar in all species in that the oxygen is acquired from the surrounding medium by diffusion through a more or less permeable membrane, on the internal side of which either the cell plasm or the blood transports it to living cells, where it now takes such vital part in their nutrition and life. These cellular activities may be termed "internal respiration."

It is now my purpose to review briefly the beautifully subtle manner in which the animal organism through its various phases acquires for itself this essence of life imperative for its survival and incidentally uses it for that love song, so to speak, with which to allure its mate for the perpetuation of its species.

UNICELLULAR ORGANISMS

I shall first consider the unicellular organism, which in a way may represent the component parts that make up the whole of the higher orders, which are but an aggregated although organized arrangement of cells separated anatomically by physicochemical interphases to make the tissues, organs and complicated structures of the higher mammals, and even unto God's image, as we are pleased to call man. For such a unicellular organism I shall select the humble but sometimes deadly ameba, which, although it may have some excretory respiratory faculty, acquires the essence of life by direct inward diffusion due to the negative difference in the partial pressure of oxygen between its internal and its external environment. If we can imagine such a small cell acquiring the source of life and power from the sludge that surrounds it, we can quite easily appreciate how the primitive multicellular animal developing in the primordial mud must have evolved some more efficient means of acquiring this breath of life. As they progressed into more complicated entities and the competition for propagation became more intense, they necessarily had to move faster and this demanded a more efficient method of locomotion than the plasmodial pseudopodia of yore. But increased movement requires an increased supply of oxygen. As by now the surface

From McGill University Faculty of Medicine and Royal Victoria Hospital.

Read before the joint meeting of the American Medical Association and the Canadian Medical Association, Atlantic City, N. J., June 11, 1935.

membrane for protective purposes has lost much of that quality suitable for the diffusion of gases, some means must be provided for the acquisition of the breath of life, which is being required in increasing amounts. These means are ingenious and have numerous variations but in principle are more or less the same. In special areas the cuticle remains thin and delicate and may be a smooth surface or thrown into folds with indentations of varying complexity. These may be considered as rudimentary gills. Their situation differs from species to species but there is one more or less constant feature; namely, they are on or near the organs of locomotion. I might take as a good example the Isopoda, in which respiration is effected by the broad rami of the abdominal limbs. The renewal of the water, containing the oxygen, on the respiratory surfaces is brought about and accelerated by the movements of the limbs on which they are located, but often certain appendages bear special lobes adapted to set up a current under the shell or carapace and thus flush the chamber in which the gills are situated. So increased activity is served by serving itself. These are but slow moving creatures, although they do as best they can.

GILLS AND SWIM BLADDER OF THE FISH

As we proceed upward in the scale of development we find as the consumption of oxygen in the tissues is more rapid that there is an increasingly facile manner of acquiring it, until at last the medium containing it flows in increasing quantities past delicate membranes of vast area where freely circulates in capillaries the blood that is to acquire and carry the oxygen to the far distant cells to play an essential part in nutrition. This is well exemplified in the completely developed gills of the fish. These delicate organs perform a wondrous task and can meet changes in external environment in a manner to arouse our admiration. In lakes and oceans and deep bodies of water the oxygen held in solution decreases as the depth increases. But even at the best of times the concentration is low. The great handicap under which the aquatic animal is living may be realized when it is considered that a liter of air at ordinary temperature contains 210 cc. of oxygen. A liter of water contains only 3 to 9 cc. This means that aquatic animals have at their disposal at the most in a liter of their immediate environment less than one twentieth of the amount of oxygen which an air-breathing animal has. To compensate for this, fish have a great capacity for extracting oxygen from the surrounding water and can do so even when the variations of concentration fluctuate acutely over a relative range to which an air-breathing animal could not possibly accommodate itself so rapidly.

In addition to gills, fish have another interesting organ, namely, the swim bladder, which in some has a respiratory function. This organ contains gases in practically the same proportion as in the surrounding medium and its contents usually vary with it. In most fish it undoubtedly is filled by physical diffusion, but in other cases there would appear to be an active inward secretion of gases. About this point revolves one of the important physiological controversies of the day: Can the human being secrete oxygen inward if exposed to suitable environmental conditions? On this question I shall not tarry, as the future holds the solution. To return to the swim bladder: In addition to such respiratory functions as it may have, it acts as a hydrostatic organ allowing the fish to volplane and loop the loop, dive to great depths and soar to the surface of its environment, and at the same time permits it to receive the triste song of its mate and to send her its call for one night of love.

THE AMPHIBIA

But we must pass on to the amphibia, from which we shall choose the humble frog, who in pollywog days has gills; but when he reaches his prime and becomes the basso profundo of his world he can breathe not only with his lungs but also through his skin, especially in those forms which hibernate in the mud. So he can adapt himself to the vicissitudes of his environment and still acquire sufficient oxygen for his humble needs.

BIRDS

From the waters we now soar to the firmament above and consider the streamline bird, which acquires the oxygen from the air through its lungs, which are relatively small; but this is compensated for by the bronchial tubes connecting with air spaces extending into the bones. The inspired air is thus distributed all over the body, so that aeration of the blood is not confined to the somewhat limited lung surfaces. This, however, serves another purpose: by lending lightness and buoyancy to the frame, it helps the bird in its flight and rapid change of altitude.

MAMMALS AND THE EXPLOITS OF MAN

So finally we come to the mammals, the example of which will be man, whose external respiration is accomplished entirely through the lungs. He has no accessory or auxiliary respiratory mechanism. As the air is inspired it rapidly ventilates the lungs. This ventilation is so delicately adjusted and flexible as to maintain the oxygen content of the mean alveolar air at such a constant level under all ordinary circumstances as to saturate almost completely the hemoglobin, which acts as the oxygen reservoir for the blood plasma, from which the tissues obtain this breath of life. But this is not the only function of respiration. Biologic processes may at times seem wasteful, but if so there is a reason, if we can find it, which will reveal that it is the best under the circumstances and is accomplishing other functions vitally important for preservation or propagation. In addition to supplying the body with oxygen it eliminates carbon dioxide, removes water, helps to regulate the body temperature, is the fine adjustor of the chemical reaction of our internal environment which is maintained with remarkable constancy and, last but not least, serves us to tell our own story. If this were all it would be wonderful enough. But man has not been content to remain in his ordained surroundings. He has aspired to imitate the fish of the sea and the birds of the air. He is an envious and interfering creature, always poking his nose into other people's back yards, spying on their personal affairs out of pure curiosity; and to accomplish this he has used the ingenuity of Satan because he is not equipped by respiration to do it without danger to himself. The curiosity of Eve and the wisdom of the serpent have driven him onward, sometimes to his doom, in the name of truth and science. And the curious part of the whole thing is that he is succeeding.

When he aspired to invade the domain of the humble fish he thought the only thing necessary was to be supplied with the breath of life. But he soon found

that his finned cousin had power to stand variations in external pressure such as would crush him to a pulp. Furthermore, this respiratory business was not so simple. There were other things to be taken into consideration besides oxygen. The laws of physics have an uncomfortable way of being consistent. Although 80 per cent of the atmosphere is nitrogen and of no account in life, he failed to appreciate that it still obeyed these laws and diffused into the plasma in amounts proportionate to the increase in the partial pressure. So, when he returned from visiting his friend the fish in the depths of the sea he became acutely aware that all was not well within him. He found himself full of bubbles; in fact, he was like a soda-water bottle that has been suddenly uncorked, and he further found that air emboli have an aggravating way of "gumming up the works," so to speak, and the laugh was with the fish. But seeming defeat only made him more persistent. He found the reason and sought the remedy, which in common with most truths was simple. Instead of uncorking himself suddenly he learned to do it gradually so as to blow off his excess nitrogen at a safe rate. But this was a slow process and inaccurate, so he decided to do this with mathematical precision and found he could "de-gas" himself not only more rapidly but with greater safety. So now, having mastered his respiratory difficulties, he decided to visit his friend the fish and explore his habits and haunts whether he liked it or not. In fact, this Peeping Tom even took photographs without their permission and the final insult was moving pictures of their most private and intimate doings. Poor fish, your privacy is gone for ever!

Man, having conquered the depths of the sea, turned his attention to the bowels of the earth. Many of his engineering difficulties were inherent in the human factor. But survival in compressed air solved certain of these and permitted him to burrow like a rabbit. In order to satisfy his craving for speed and his avarice for the treasures of mother earth, he proceeded by exploratory operation and permanent anastomosis to expose her whole interior. Happily the earth worm and the gopher are not subjected to the indignities of the fish.

Since the beginning of time, man has been envious of the bird. Envious of its freedom! Envious of its flight! Although he could burrow in the earth and swim in the sea, he could not fly; so his soul was depressed and his spirit angry. Again defeat spurred him on until at last like the fledgling he made his first clumsy and blundering flight from his nest on earth. Now he had in his hand the possible means to outfly and outsoar the bird and within a few short years this had been done. But he soon discovered that respiration put a limit to his ambitions. As he soared like the falcon into the eye of the sun, he found there were limitations not of his machine but within himself in that the breath of life seemed to leave him. The atmosphere was there—it supported his birdlike structure but it could not support him. The explanation was not far to seek. With the increasing altitude the partial pressure of the atmospheric gases steadily declined until finally that of oxygen was not sufficient to penetrate the alveolar walls to saturate the plasma and hemoglobin in sufficient amounts to support life. Realizing that it is not the percentage of a gas which determines its rate of diffusion, but its partial pressure which is the sum of its concentration and barometric pressure, man decided to increase the former as he could not alter the latter. So, with his oxygen tank and respirator he found the means to overcome his respiratory limitations.

INTERNAL RESPIRATION

Now we must leave external respiration and travel with the hemoglobin and its load of oxygen along the labyrinth of the arterial tree to the cells of the body. It must be clearly remembered that these obtain their oxygen from the tissue fluids surrounding them and these in turn receive it from the plasma of the blood, with which it is in physical equilibrium. The amount of oxygen used by the tissues is in direct proportion to the amount of work done, although some tissues require more than others. As the oxygen in the tissue fluids and plasma is consumed it is immediately replenished from the oxyhemoglobin, the dissociation of which occurs with great rapidity. We are now back to the unicellular organism again. Whereas the ameba had to seek for the breath of life where best he could, our cells have it brought to them ready to use with the least effort on their part.

What do they do with it? This brings us to life itself.

We must remember that in the structure of any organism, no matter how complex, the one purpose that is rigidly adhered to is the maintenance of a continual supply of energy to the individual cell.

Our ancestors, with considerable justification from an imaginative standpoint, compared life to a flame. The contemplation of an open fire with flames of different form, color and intensity is impressive from the ever varying, unordered and uncontrolled changes taking place. How similar are the processes of life! No living thing is absolutely still; alterations in position relative to environment, alterations in form, in growth, and finally changes in the atomic and molecular structure make for ceaseless activity, and just as the changes in a fire are physicochemical so also are the changes in living matter physicochemical.

The power to live, the power to work, is not in the brain or in the body, just as in a machine the power is not inherent in the pistons, valves and fly-wheels. The power of living matter or machinery comes from without. What is this energy; how is it made available, and how does it operate in living matter? Of the total energy of the universe part is available for work (free kinetic energy) and part not directly available. Our struggle for existence, as Boltzman has put it, "is the struggle for free energy."

What is our source of energy?

Firstly, plants act as the transformers of the kinetic energy of sunlight, converting it into the potential energy of carbohydrates, fats and proteins.

Secondly, to understand how this energy is made available to the individual cell is to understand the fate of the foodstuffs following ingestion and the changes undergone during digestion, absorption and assimilation, which will be discussed by Dr. McLester.

Lastly, it is following the liberation of this potential energy in the animal organism that the internal respiration has its function.

Our modern conception of calories, combustion, and the fine values of foodstuffs has brought the idea of

oxidation and heat production so much before our minds that we are apt to consider our bodies as a sort of glorified steam engine puffing laboriously through life on the caloric equivalents of breakfasts, lunches and dinners. The fallacy of this conception is shown by a brief consideration of Carnot's equation, whereby it can readily be shown that, if the liberation of energy in our bodies took place by the conversion of foodstuffs to heat with a working efficiency of 25 per cent, then the temperature of the heat source would have to be 116 C. or, in other words, at a temperature of 69 C. above the lethal point. It is quite evident then that, when we convert bound energy into free energy, conversion of foodstuffs into heat is not one of the steps. It is not known how living material is able to convert the chemical energy of foodstuffs into mechanical energy, but one thing we are sure of: the liberation of energy in the animal is invariably followed by oxidation, and this oxidation takes place on or in the surface of the cellular units.

Our entire respiratory mechanism with its colossal surface area of more than 100 square meters and a red blood cell carrying surface of more than 3,000 square meters exists for and is controlled by the demands of the tiny individual cells. The breath of life is oxygen; the seat of life is the cell.

REPRODUCTION

I have already mentioned that most of the functioning systems carry out multiple tasks. This is one of the beautiful economies of the animal organism. As respiration is essential for the life of the individual, it is not surprising that it should play a part in arranging for the generations to come. It is true that this may be considered merely an accessory function but withal an important one in the propagation of the species. The most primitive song of love has not as yet been recorded but we do know that in certain coelenterata of the free-swimming variety there are ostocysts, called by more recent authorities statocysts, as they are considered to serve a greater purpose for equilibrium than for hearing. That they serve both purposes there can be little doubt. The call of the earthworm we do not know, nor that of the fish, but there is ample evidence to show that the gaseous swim bladder is used both for sending and for receiving messages. Time does not permit mention of other species, but we cannot pass by that troubadour of the early summer night, the bull frog. Who has not listened to his song and the answering chorus from afar? He takes no chances. Being of the amphibians, he sits at the water's edge and sends his stentorian basso through both the water and the air so that all may hear. His song is as sweet to the fortunate who understand as is that of the "blithe spirit" of which Shelley sang, or the serenade to the lovely maiden as she sits behind the balcony screen in old Seville. The breath by which life is maintained does its part to ensure that this spirit may be carried on in future generations.

CONCLUSION

Now I hand over the future of man to my esteemed colleague and friend Dr. McLester. But before closing I wish to express to the officers and Fellows of the American Medical Association, on behalf of myself and my countrymen, our deep appreciation of your kindness in having us as your guests and I extend to you our thanks for your gracious hospitality.

NUTRITION AND THE FUTURE OF MAN

PRESIDENT'S ADDRESS

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Man's place in future history will depend in no small degree on the food he eats. The truth of this was foreshadowed about two decades ago when it was discovered that an animal's life processes may be profoundly disrupted by the omission from its food of any one of a number of substances, each of them ridiculously small in the amount required. Today there has been added the further, highly significant, observation that under certain circumstances an animal's life may be greatly improved by the addition of appropriate foods to a diet that previously had been regarded as entirely satisfactory. Through this knowledge, physiologists have been able to influence to a surprising degree the life history of their experimental animals and in some instances so to improve the stock as apparently to produce a new species.[1] Can this be applied to man? Can man, by giving thought to the food he eats, influence the destiny of his race? There is reason to believe that he can.

IMPROVEMENT OF RACIAL STOCK THROUGH DIET

Improvement of the stock as a result of betterment of the diet has been observed repeatedly both in the lower animals and in man. Among the earliest experiments in this field were those of Osborne and Mendel, who were able to show that what had previously been regarded as normal weight for the albino rat was not a fixed figure but was subject to material increase with improved nutritive conditions. The previously accepted standard weight of this experimental animal at 100 days of age, as established by Donaldson in 1906, was 165 Gm.; but a few years later, under improved nutritive conditions, the standard for rats of that age was raised to 200 Gm., and within another decade to an average weight of 315 Gm. In this series of experiments the increase in weight of the albino rat, beginning at 2 Gm. a day, was raised first to 4 Gm. and finally to 6 Gm. Thus, during a period of twenty years, under conditions that were not varied except for improvement in the ration, the rate of growth of these animals was trebled and the standard weight for the species was about doubled. This improvement has not been limited to mere increase in bulk, for there has been concomitant improvement in all phases of physical development, including growth of the bones and inner organs and, according to Sweezy,[2] changes in cellular structure. It should be emphasized that the earlier generations of rats on which these studies were begun were living on rations that at the time were apparently suitable, and that it was by reconstruction of a supposedly adequate diet in accordance with newly discovered nutritional principles that this improvement was effected. It would appear that, by intelligent improvement of the animal's nutrition through successive generations, there has been developed a new species of albino rat.

Is the increased rate of growth of these animals to be regarded as wholly favorable? Most physiologists

President's address before the American Medical Association in joint meeting with the Canadian Medical Association, Atlantic City, N. J., June 11, 1935.

1. Smith, A. H., and Bing, F. C.: Improved Rate of Growth of Stock Albino Rats, J. Nutrition **1**: 179 (Nov.) 1928.

2. Sweezy, quoted by Smith, A. H.: Yale J. Biol. & Med. **4**: 551 (March) 1932.

answer yes, but McCay [3] states that such forced development, as he regards it, is not compatible with longevity. He believes that such animals age early and die prematurely. Against this criticism, Cowgill offers the pertinent suggestion that the increased metabolic needs of the more rapidly growing animals of McCay's series were possibly not met by commensurate increases in certain essential substances, and that under such circumstances a relative deficiency, with nutritive failure and consequent early senility, would necessarily follow. Of like import is the experience of Sherman,[4] who has observed that when an apparently adequate diet is enriched in certain of its chemical factors by an increase in the proportion of milk there results not only an increase in the rate of growth but also an improvement in vitality and in the animal's average length of life. It is well known that increased vigor and sustained longevity are among the notable accompaniments of improvement in an animal's ration. It can safely be said, therefore, that the experiences of other physiologists are not entirely in accord with those of McCay and that the preponderance of evidence indicates that the increased growth achieved by well considered improvement in the diet is accompanied by general physiologic betterment and definite improvement of the species.

IMPROVEMENT IN CHILDREN OF IMMIGRANTS

Have comparable changes, the result of improved living conditions, been observed in man? Yes, anthropologists tell of similar changes, which, while not so graphic as those seen in the lower animals, are none the less significant. Witness the report of Appleton [5] that Chinese living under improved nutritive conditions in Hawaii grow to greater stature than people of the same racial strain in China, and that their growth continues to a more advanced age than does the growth of those remaining in the less hospitable homeland. The average height at 20 years of age for the group studied in Hawaii was 1.1 inches greater than that of similar groups in the ancestral province of Kwantung. A similar report from Kanzaki [6] tells that children born of Japanese living in California show definite superiority in height, weight and other characteristics over their immigrant parents. The same can be said of other races who have emigrated to America, for it is of frequent comment in the larger American cities that children born in this country of European parents are of larger stature and better physique than their forebears. It is a common observation in medical schools that the Jewish students of European parentage who apply for admission are strikingly superior in physical attributes to their parents. The anatomist Todd [7] has recently commented on changes of the form of the head seen in the children of immigrants, and of other changes which would indicate that the improvement in physique that is now being observed is not limited to mere increase in stature but is also an expression of better general development.

RESULTS OF HYGIENE AND IMPROVED NUTRITION

Such improvement in racial strain is not limited to those peoples who emigrate to more favored lands, for like superiority of development is seen to accompany better living conditions among the children of natives both in this and in other countries. Witness the studies of children from different social groups in this country made by Gray and Nicholson [8] in Eastern private schools and by Faher in San Francisco, indicating that those of the more favored groups grow to a greater height. Of 4,000 women students who have entered Stanford University during the past thirty years, Mosher [9] found that, although the average age of women coming to the university today is less than formerly, the average height has increased a little more than 1 inch. She believes that the changes reported by her point to a more fully developed and more perfectly functioning type of American woman. Similar reports come from England. The anatomist Parsons,[10] of the University of London, believes that hygiene and better nutrition have undoubtedly raised the height of upper class Englishmen, in illustration of which he cites the fact that while the average height of the modern English working classes may be taken as 5 feet 5 inches (165 cm.) that of the more well nourished group is definitely higher, the average among medical students being 5 feet 9 inches (175 cm.). Of like import were the observations of Mann, undertaken for the British Medical Research Council, to the effect that, on the ordinary diets assumed by medical men to be proper for healthy development, the boys studied by him did not reach the full physical or mental growth of which they were capable, and that it was only when these diets were supplemented by milk that the best growth was attained. Similar evidence was seen in the more rapid growth observed during the large-scale experiment of distributing free milk to the school children of the Scottish county of Lanarkshire. Thus it is evident in man as in the lower animals that improvement in a diet that previously had been regarded as adequate will often result in a larger stature and a higher degree of development.

It should be emphasied, however, that larger stature is not the sole advantage that comes from improvement in diet, for there is abundant evidence that greater physical efficiency also follows. This was shown in a recent observation [11] that, of 160 English school children selected to compete in athletic events, 87 per cent of the winners were above the normal for height and weight and only 6 per cent below normal, and that the winners showed a proportion of overweight three times that of the seconds, thirds or "also rans." From the English air service [12] comes the report that athletic prowess and the capacity to endure physical stress, except in long distance events, was found most commonly in overweight men and that men who are underweight on joining the service are more often invalided out than are those who are overweight. From Japan there was issued a public health bulletin [13] stating that, when groups of Tokyo school children were given milk as a supplement to the diet, not only was greater increase in weight and height observed but these children were more cheerful and happy and showed greater prowess in athletics than did those of the control groups. Experiences such as these have brought physiologists

3. McCay, C. M.: Is Longevity Compatible with Optimum Growth? Science **77**: 410 (April 28) 1933.
4. Sherman, H. C.: Food and Health, New York, Macmillan Company, 1935.
5. Appleton, V. B.: The Growth of Chinese, China M. J. **40**: 259 (March) 1926.
6. Kanzaki, Kiichi: Is the Japanese Menace in America a Reality? Ann. A. Acad. Polit. & Soc. Sc. **93**: 88, 1921.
7. Todd, T. W.: Anthropology and Growth, Science **81**: 259 (March 15) 1935.
8. Gray, Horace, and Nicholson, S. T.: The Tallest American Boys, J. A. M. A. **88**: 2022 (June 25) 1927.
9. Mosher, Clelia D.: Concerning the Size of Women, California State J. Med. **19**: 53 (Feb.) 1921.
10. Parsons, F. G.: A New Type of Englishman, Am. J. Phys. Anthrop. **11**: 378 (Jan.) 1928.
11. Dunstan, W. R.: Athletics and Weightage, M. Officer **52**: 121 (Sept. 22) 1934.
12. Treadgold, H. A.: Functional Efficiency and Body Build in the Young Male Adult, Lancet **1**: 1377 (June 30) 1934.
13. Cow's Milk and Growth of Children, Bull. Pub. Health A. Japan **5**: 1, 1931.

to the realization that a diet which appears to be adequate is not invariably the optimum diet. Far from it. In this connection Sir Frederick Hopkins [14] writes:

> The mere survival of a community, for instance, is too often taken as proof that the nutrition of its constituent individuals is adequate; lack of health or efficiency being attributed to racial or other uncontrollable factors. In social-economic surveys a race or community is found in equilibrium with an environment which includes its food supply. It is often forgotten that such environment is fortuitous and that the equilibrium reached is one in which the community, while managing to survive, may yet be functioning at levels far below those possible to its innate capacities. . . . During the whole of history the needs of nutrition and the kind and amount of foods geographically available have played a great part in determining the destiny of races. Inadequacy in the supply has in some cases stunted innate capacities and led to the degeneration of a race; more generally in the past it has stimulated effort and led to migrations and wars of aggression.

In nutrition the words adequate and optimum are seldom synonymous.

INFLUENCE OF HEREDITY AND ENVIRONMENT

Such statements would seem to deny the influence of heredity; but this is not true, for heredity and environment are both of influence. The two combine to shape man's destiny. The truth of this is seen in those instances in which inherited characters have been profoundly altered by environment. This applies to details of structure as well as to other physical attributes. Witness the great sensitiveness to nutritional disturbances exhibited by the growth centers in the bones of the face. In infancy nutritive deficiency has its effect on the transverse and anteroposterior dimensions, while after five years retardation of vertical growth is most apt to occur. This explains the changes in the shape of the face which Broadbent has demonstrated in malnourished infants, and the difference in facial expression observed by Boaz between the foreign born and the American born children of immigrant parents. While the exact type of structural change produced by nutritional failure depends somewhat on the nature of the deficiency, it is a rule that malnourished children, as was observed by the Bakwins,[15] suffer more in the growth of their transverse than in their longitudinal dimensions. The long bones continue to grow and there often results a thin individual with a misshapen chest and a gaunt, lanky appearance. This was beautifully stated by Todd,[7] when he wrote "The adult physical pattern is the outcome of growth along lines determined by heredity but enhanced, dwarfed, warped, or mutilated in its expression by the influence of environment in the adventures of life."

This influence of environment is far reaching. Under unfavorable environmental conditions the development of a person's finer qualities are sometimes seriously retarded, while, on the other hand, under optimal circumstances his less fortunate traits may be mitigated. Even his period of usefulness may be greatly extended. One may accept Warthin's view that man's span of life is fixed by inheritance and is unchangeable, but "lives there a man with soul so dead" who does not ardently desire some means by which within his alloted span he may lengthen the years of his usefulnesse There is evidence, as was recently emphasized by Sherman,[4] that this can be done, that by improvement of a diet that already is apparently adequate man's prime of life, in both directions, may be considerably extended. The hastening of maturity may not be of interest to many people, but the postponement of senility through betterment of the diet is an alluring thought to every one.

THE GOSPEL OF GOOD FOOD

If such is the influence of environment, it should be possible through improved nutrition to bring mankind to a higher level of physical development. How is this to be accomplished? In this respect the American people are not indifferent. Indeed, they are acutely food conscious and will eat anything that they are told is healthful; but to teach them what they properly should eat will require the combined efforts of a great many people, notably the teacher, the physician and the publicist. In addition, in order that people may, within the means at their disposal, get the foods they need, there must also be elicited the help of the economist and the law maker.

Education comes first. Health education by means of nutrition classes such as is being carried on in the public schools of my own and of other cities can be expected to pay big dividends, for not only are the pupils themselves helped but these children carry the gospel of good food into the home and eventually elevate the nutritive standards of the entire family. It is a hopeful sign, too, that the physician himself is taking an infinitely greater interest in the science of nutrition than he has shown in the past. He can be expected to give to his patients dependable information which will eventually percolate throughout the community and bring widespread good; but unless he is also something of an economist he is apt to make the mistake at times of prescribing foods that the family budget will not afford. It is not sufficient, therefore, that the physician interest himself merely in the science of nutrition. He must study also the economics and distribution of foods and be prepared to prescribe diets that not only meet the patient's physiologic needs but also are within his easy reach. The necessity for the wider dissemination of such knowledge is seen in the fact that a great deal of malnutrition comes from the unenlightened selection of foods made by the housewife with a rigidly restricted budget. It is unfortunate that many of the cheaper foods, such as the potato, which carry the greatest number of calories and have the highest satiety value, fall far short of providing in sufficient quantities such essential food factors as vitamins, minerals and good proteins. Vitamins and minerals can be obtained in abundance in fruits and vegetables, while proteins of high biologic value are found in meats, eggs and milk; but these are all among the more costly foods. The important thing, therefore, is to know how in an economical manner to use these other more costly articles in order to supplement the less expensive foods. The experiments of Mendel and Osborne, and later of Cowgill and associates,[16] would indicate that the cheaper cereals can still be used as the mainstay of the diet provided properly selected supplementary foods, such as liver and lettuce, are added in suitable amounts. In the effort to secure economical but well balanced diets Cowgill believes that, if sufficient intelligence is devoted to the selection

14. Hopkins, Frederick: Nutrition and Human Welfare, Nutrition Abst. & Rev. **1**: 3 (Oct.) 1931.

15. Bakwin, Harry, and Bakwin, Ruth M.: Body Build in Infants: I, II and III, J. Clin. Investigation **10**: 369, 377, 395 (June) 1931; Body Build in Infants. V. Anthropometry in the New-Born. Human Biol. **6**: 612-625 (Dec.) 1934.

16. Cowgill, G. R.; Jones, Margaret H.; Frisch, R. A., and Jackson, G. P.: Studies on the Effect of an Abundant Cereal Intake, J. A. M. A. **89**: 1770 (Nov. 19) 1927.

of these supplements, man can use cereals to a greater extent than is common today in this part of the world. It is because of its high supplementary value in a diet of cereals as well as of other foods that nutrition experts as a rule insist that a place be provided in the budget for definite quantities of milk and milk products. Even with today's high prevailing prices milk is still a bargain in food values. Thought must always be given to the protein allowance, too, since animal experiment as well as observations on man, such as those of Youmans in Tennessee, would indicate that protein is often the limiting factor in these cheaper diets. It is a function of the physician and the educator, then, to teach people the proper use of the protective foods in supplementing the cheaper diets.

IMPORTANCE OF FOOD HABITS

The food habits of a people are determined to an enormous degree by custom. What is commonly regarded as a diathesis or familial predisposition not infrequently, as has been pointed out by Cowgill, is an expression of the faulty food habits of the family. So dominating are the tabus and customs of a family or race as regards their food that these sometimes assume all of the force of mores. If the food habits of a people, because of poor supply, religious prejudice or other reason, are grievously at fault, in all likelihood these will be accompanied by a gradual deterioration of the family or race; if, on the other hand, these habits are good, this circumstance will be reflected in more advanced physical development, greater longevity and a higher level of cultural attainment. Here in America, where so many foreign groups have brought with their Lares and Penates their food habits as well, racial customs must be taken into consideration. If these customs are good, the physician in offering advice must accept them; if they are faulty, he must endeavor by education to combat them.

POLITICAL AND ECONOMIC FACTORS

I do not wish to discuss the political implications of my subject, but it must be recognized that any plan that proposes to elevate racial standards by means of improved nutrition must give serious consideration to political and economic factors, for in the carrying out of such a plan food must be produced in adequate amounts and marketed at a price that the public can pay. It is difficult to estimate how many persons in this country are so poor that they are unable to purchase the food necessary to keep them in health; but if one takes the criterion adopted by Orr [17] in discussing the identical problem in England and assumes that those living on relief belong in this category, it can be said that something like twenty million American people are living near or below the threshold of nutritive safety. This condition, if continued, will surely affect the health of the race. The income of these people must be raised or the price of food lowered.

To make agriculture profitable to the extent that a good rural population can be maintained and at the same time the rest of the population supplied with cheap food is a problem that confronts the nation. This is a subject for economists to discuss, but I should like to call attention to the report of the Elgin Committee, appointed to determine a National Agricultural policy for Scotland.[17] After offering the familiar advice that methods of distribution be so reorganized as to reduce the wide and growing difference between what the consumer pays and what the producer receives, the committee concluded that "it is in the interests of the state that the price of food should be kept so low that the poorest can obtain an adequate dietary." Adequate nutrition, then, is in the last analysis a problem of education and of government.

17. Orr, J. B.: Chadwick Lecture, 1934, Aberdeen, Scotland, Rowett Institute.

MASTERY THROUGH SCIENCE

In the past, science has conferred on those peoples who availed themselves of the newer knowledge of infectious diseases better health and a greater average length of life. In the future it promises to those races who will take advantage of the newer knowledge of nutrition a larger stature, greater vigor, increased longevity and a higher level of cultural attainment. To a measurable degree, man is now master of his own destiny where once he was subject only to the grim hand of Fate.

THE DANGER OF GANGRENE OF THE TOES

IN THROMBO-ANGIITIS OBLITERANS AND ARTERIOSCLEROSIS OBLITERANS

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In spite of warnings by Buerger,[1] Brown,[2] Allen and others, the vulnerability of the toes of patients with peripheral occlusive arterial disease has not been sufficiently emphasized. At the Mayo Clinic, approximately 20 per cent of such patients have definite gangrene of the toes or feet on admission. In a series of 171 consecutive cases of thrombo-angiitis obliterans in which the patients when first seen had definite gangrene of the toes or feet, ninety-four patients (55 per cent) stated that the gangrene had occurred spontaneously, and seventeen (10 per cent) stated that it had followed accidental, mechanical or thermal trauma; on the other hand, sixty (35 per cent) stated that it had followed therapeutic procedures instituted for painful toes or feet when gangrene or ulceration had not previously been present.

These figures are still more appalling when it is added that thirty-two, or more than 50 per cent, of the patients in the latter group lost their legs subsequently because of this gangrene which had been induced by treatment. Similarly, in 115 consecutive cases of arteriosclerosis obliterans in which patients had gangrene of the toes or feet, accidental trauma had been the inciting cause in nineteen cases (17 per cent) and therapeutic procedures in forty-five cases (39 per cent); in twenty-eight cases in the latter group, amputation of the leg was necessary.

A more detailed analysis of these cases of traumatic gangrene and gangrene induced by treatment is worthy of consideration. In table 1 are given the known accidental causes of gangrene. It is possible that this number would be swelled considerably from the group of spontaneous gangrene if more information had been available. There is a certain amount of trauma to the

From the Division of Medicine, the Mayo Clinic.

1. Buerger, Leo: The Circulatory Disturbances of the Extremities, Including Gangrene, Vasomotor and Trophic Disorders, Philadelphia, W. B. Saunders Company, 1924.
2. Brown, G. E.; Allen, E. V., and Mahorner, H. R.: Thrombo-Angiitis Obliterans, Philadelphia, W. B. Saunders Company, 1928.

feet in walking, particularly if the patient's shoes do not fit well. Minor contusions, small blisters and chilling may have passed unnoticed by the patient.

In table 2 are listed the causes in this series of cases of gangrene induced by treatment. Seven of the sixteen corns and calluses were removed by chiropodists. All of the other surgical procedures were carried out by physicians. The first three chemicals were suggested by druggists, the remainder by physicians. Eight of the ten burns were sustained in hospitals. Thirty-three of the forty-three toenails removed in part or in whole were from the great toe, and eleven of the sixteen corns removed were from the fifth toe. For anatomic reasons, one or the other of these two toes usually suffers most from ischemia in a given case and is therefore the most vulnerable. Five of the chemical and four of the thermal burns involved the entire foot. It would seem that in these cases the physicians who treated the patients had failed to recognize the presence of arterial disease or else were unaware of the hazards of such local treatment in the presence of arterial insufficiency.

The end results in the 105 cases of gangrene induced by treatment are given in table 3. In the cases of thrombo-angiitis obliterans, half of the amputations of the leg were done at the clinic. In these cases conservative treatment was carried out for a considerable period of time, and the leg was sacrificed only because of extensive and progressive death of tissue or because of uncontrollable pain. In those cases in which healing took place without amputation, the period of disability ranged from one month to four years, in the majority of cases lasting from three to nine months. Making all allowances for the possible development of spontaneous gangrene, if the original surgical, thermal or chemical trauma had not occurred, the price in time, money and loss of limbs which these patients paid for well intentioned but misdirected treatment was truly great.

In order to understand why gangrene occurred so easily, it is necessary to review the pathology and pathologic physiology of occlusive arterial disease of the extremities. In the majority of cases localized, occlusive arterial lesions occur periodically. Between

TABLE 1.—*Gangrene Induced by Accidental Trauma*

Cause of Gangrene	Cases: Thrombo-Angiitis Obliterans	Cases: Arteriosclerosis Obliterans
Contusion and crushing injury	12	7
Cuts while trimming nails	2	3
Frostbite	2	2
Actinic burn (sun)	1	0
Thermal burn	0	2
Blisters from friction	0	5
Total	17	19

these episodes are varying periods of quiescence, during which the compensatory collateral circulation increases slowly. During active periods of the disease, and dependent somewhat on the extent and localization of the occlusive arterial lesions, many of these patients suffer from marked degrees of ischemia of the toes. Sometimes this ischemia is enough to cause spontaneous gangrene. Sometimes the tissues of the digit are perilously close to death, but if some form of additional trauma does not occur they will survive until the collateral circulation increases the blood supply well beyond the danger limit. During periods of marked ischemia, even slight trauma to the toes is a serious event. Minor bruises, irritation from rubbing of shoes, moderate exposure to cold, and even the pressure of weight bearing that occurs in simple walking may be just enough to destroy cells that are poorly nourished and poorly oxygenated and start the gangrenous process. It is quite possible that in many cases what is considered to be spontaneous gangrene has such an origin and that there is really a traumatic factor in its

TABLE 2.—*Gangrene Induced by Treatment*

Cause of Gangrene	Thrombo-Angiitis Obliterans	Arteriosclerosis Obliterans
Surgical:		
Removal of part or all of toenail	34	9
Incision for suspected abscess	3	7
Removal of corn, callus or nodule	9	7
Application of cast for sprain	1	0
Application of adhesive tape for sprain	0	1
Thermal (burns):		
Hot packs	0	4
Hot water bottles	2	2
Hot foot baths	0	1
Electric heater	0	1
Chemical:		
Freezone	1	1
Bethulol oil	1	0
Phenol	1	1
Caustic paste	1	0
Concentrated merthiolate	1	0
Salicylic acid ointment	1	1
Carbolated petrolatum	2	2
Hydrogen dioxide and alcohol	0	1
Iodine	0	2
Unknown ointments	3	3
Total	60	45

production. How much more serious, then, is a surgical wound that destroys part of the blood supply, which already is poor, and increases the risk of bacterial infection of badly devitalized tissues. How much more serious is a thermal burn to tissues which are barely surviving at optimal temperatures, or a chemical burn to tissues in which there is already a profound disturbance of tissue chemistry. Once the gangrene has started, it may spread with alarming rapidity even beyond the toe to the foot itself, and the conservative treatment of peripheral occlusive vascular disease with frank gangrene is likely to be long, discouraging, expensive and not always successful.

Although the development of gangrene is a serious event in thrombo-angiitis obliterans, it is even more serious in arteriosclerosis obliterans. In arteriosclerosis obliterans the occlusive arterial disease is likely to be more progressive and the collateral circulation develops more slowly than in thrombo-angiitis obliterans. In the former condition the tissues of the toes and feet have a lower vitality, less resistance to trauma and less ability to heal ulcers, even in the presence of a blood supply that is only moderately limited, than they do in thrombo-angiitis. Arteriosclerosis obliterans is sometimes complicated by diabetes mellitus (as it was in a fifth of the present group with gangrene) and, if so, the spread of the gangrene is likely to be much more rapid and secondary infection is likely to be much more common. A rapidly spreading cellulitis of the leg and septicemia may occur and be followed by death.

The patient who is suffering from marked ischemia of the toes which has resulted from an active phase of thrombo-angiitis obliterans or arteriosclerosis obliterans usually consults a physician because of severe pain which results from the ischemia of digital tissues and nerve endings. He may have ingrown toenails, corns, trichophytosis or red swollen toes that appear to be infected. Possibly the ischemia has greatly aggra-

vated the pain of an old corn or ingrown toenail. Most physicians frequently see corns and ingrown toenails in feet that have a normal blood supply, but they do not frequently see cases of thrombo-angiitis obliterans and arteriosclerosis obliterans. However, in a case in which there is a painful toe or a lesion of the toe, regardless of how apparent the cause may be, it is a comparatively simple procedure for the physician to assure himself that pulsations are present in the dorsalis pedis and posterior tibial arteries, that there is no abnormal pallor of the toes after elevation of the foot, or that there is no delay in return of color on suddenly bringing it to a dependent position after elevation. He should also beware of an "inflamed" toe that is cold. Abnormal color of feet or toes, whether pallor, rubor or cyanosis, should excite suspicion of arterial disease. If there is evidence of deficient arterial blood supply, which was very easily demonstrated in all of the cases in this series, it is a safe rule to avoid all minor surgical procedures and to avoid all local applications except possibly warm foot-soaks of boric acid solution (not over 103 F.). In such a case the patient should be kept off his feet. The affected foot should be kept warm with heat at a distance, and measures to increase the circulation to its maximal extent should be the principal therapeutic consideration.

It is commendable that newer methods of treatment, such as sympathetic ganglionectomy and the various medical vasodilating procedures, are definitely reducing the incidence of gangrene and amputation of the leg in thrombo-angiitis obliterans. No small credit is also due to education of the patient regarding the nature of his disease and how to give his feet the maximal protection. If well intentioned surgical, thermal and chemical trauma to ischemic toes can be avoided, the incidence of gangrene will be lessened much further.

SUMMARY

In cases of peripheral occlusive arterial disease, the toes are extremely vulnerable and gangrene may easily be induced by even mild degrees of injury. In a series of 171 cases in which gangrene was associated with thrombo-angiitis obliterans, the gangrene followed therapeutic procedures on the toes in sixty (35 per cent), and in a series of 115 cases in which the gangrene was associated with arteriosclerosis obliterans, the gangrene followed therapeutic procedures in forty-five (39 per cent). These procedures consisted chiefly of removal of ingrown toenails; less commonly they consisted of removal of corns, incisions for suspected abscesses, thermal burns, and irritations resulting from the application of strong chemicals or exfoliating ointments. Pain in the toes may result primarily from ischemia, even when there is an obviously deformed nail, or a corn. It is strongly recommended that no local surgical or medical treatment of toes be instituted in any case until the arterial blood supply has been proved adequate by palpation of pulsations in the posterior tibial and dorsalis pedis arteries, and by the absence of abnormal color changes in the elevation dependence test. If arterial insufficiency is demonstrated, local treatment of painful toes should be extremely conservative, and all possible trauma should be avoided.

TABLE 3.—*End Results in Cases of Gangrene of Toes or Feet Induced by Treatment*

End Results	Thrombo-Angiitis Obliterans		Arterio-sclerosis Obliterans	
	Cases	Per Cent	Cases	Per Cent
Slough and healing under local and medical treatment	10	17	12	27
Slough and healing after local treatment and sympathectomy	7	12	0	..
Surgical amputation of toe, with healing	11	18	3	7
Surgical amputation of toe, without healing and with subsequent amputation of leg	6	10	0	..
Surgical amputation of leg	26	43	28	62
Death	0	..	2	4

THE RÔLE OF SODIUM IN ADRENAL INSUFFICIENCY

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Thomas Addison [1] was the first to observe that complete destruction of the adrenal glands results in death. He also suggested that a study of the disease now known by his name might lead to some understanding of the function of these glands. This prophecy has been amply fulfilled. In addition to the clinical approach to the problem, as suggested by Addison, knowledge of the physiologic activities of these structures has been greatly enhanced by two other methods of attack. The first of these, a corollary of the clinical method, is represented by a study of the changes resulting from adrenalectomy in animals and the effects of extracts of various portions of the gland on the disturbances encountered. By the application of this technic, the elementary and fundamental fact that the extract of the cortex is essential for survival has been established. Furthermore, it has been shown that medullary extract as elaborated by the adrenal bodies is unnecessary for the normal activity of the animal. The second method, that of chemical isolation and synthesis, has already contributed enormously in defining many of the functions of the medullary secretion, epinephrine. The isolation of cevitamic acid from the adrenal glands is another step that has been accomplished, but the significance of the storage of this substance is still uncertain.[2] The future of the chemical approach, as far as the isolation of the active principle cortin is considered, is at the moment distinctly bright, and the physiologic and pharmacologic harvest to be reaped fills one with hope.

The adrenal glands appear to be running a close second to the pituitary body, which Harvey Cushing has so appropriately termed the leader of the endocrine band.[3] The effect of the adrenals on blood pressure and smooth muscle behavior, their intimate relation to pigment and carbohydrate metabolism, and their influence on certain phases of electrolyte physiology are now indisputable facts. Many other activities have been suggested, and the relation which these less clearly identified functions bear to those enumerated must be determined in the future. It is apparent from this brief summary that the subject of adrenal physiology has become vast in its scope and that the various methods

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From the Department of Medicine, Columbia University College of Physicians and Surgeons, and the Presbyterian Hospital.

1. Addison, Thomas: Disease of the Suprarenal Capsule, 1855.
2. Szent-Györgyi, A.: Abstracts of the Communications to the Thirteenth International Physiological Congress, Boston, 1929, p. 265.
3. Cushing, Harvey: Harvey Lectures, 1932-1933, p. 90.

of study are consequently so divergent that they can hardly be covered by any one group of investigators. It is our purpose in this paper to discuss only one particular phase of the activity of the adrenal cortex; namely, that related to its regulatory effects on electrolyte physiology and renal function.

At the Presbyterian Hospital in New York we have for a number of years been studying the behavior of electrolytes in their relation to disease. That the approach to the problem of adrenal insufficiency through the study of salt and water metabolism is a logical one may be indicated by the following brief historical sketch of this subject:

As long ago as 1831, Dr. W. B. O'Shaughnessy [4] of Newcastle-upon-Tyne made a profoundly significant series of observations on the chemical pathology of cholera. He found that the state of collapse, or what since has been termed "medical shock," [5] was associated with a decrease in the water content of the blood, a decrease in the neutral and alkaline salts of the blood, and an increase in its urea content. Moreover, he found that the inorganic constituents lost from the blood had been excreted through the intestinal canal. He concluded logically that the cure was "seemingly dependent upon the restoration of the water and salts to the blood stream." For this purpose, just 103 years ago, he resorted to the intravenous injection of physiologic solution of sodium chloride as a therapeutic measure, with the beneficial results now so familiar.

In 1874, Dr. C. Hilton Fagge [6] of Guy's Hospital reported "a case of diabetic coma, treated with partial success by the injection of a saline solution into the blood." He introduced this measure because he recognized that the state of dehydration and collapse was essentially similar to that studied by O'Shaughnessy in cholera. The importance of the loss of inorganic base and water in the production of shock is now universally recognized, and for this reason no one today would care to rely on insulin alone in the treatment of severe diabetic acidosis.

Surgeons have for many years noted the salutary effect of the intravenous injection of physiologic solution of sodium chloride in the prevention and treatment of the state of shock resulting from pyloric and high intestinal obstruction, as well as from those conditions in which for some reason there exist fistulous openings from the upper gastro-intestinal tract or the bile ducts. Gamble was the first to show that the benefit derived from this therapeutic measure was due to the replacement of water and base lost from the body.

The state of shock that may develop in these diseases as well as in certain other pathologic conditions is primarily due to the continued loss of salt and water from the blood stream and the reservoirs existing in the intercellular spaces of the body. The mechanism involved in the loss of salt and water from the blood stream and intercellular spaces is obvious in cholera, as was demonstrated by O'Shaughnessy, and is also clear in the case of high intestinal obstruction. In diabetic acidosis, base and water are lost through the kidneys with the excretion of ketone bodies. We [7] have shown recently that, even without ketosis, base as sodium and potassium is also lost through the kidneys coincident with the development of severe glycosuria. The reason for this is not yet clear.

4. O'Shaughnessy, W. B.: London M. Gaz., 1831.
5. Atchley, D. W.: Medical Shock, J. A. M. A. **95**: 385 (Aug. 9) 1930; M. Clin. North America **17**: 1379 (March) 1934.
6. Fagge, C. H.: Guy's Hosp. Rep., 1874.
7. Atchley, D. W.; Loeb, R. F.; Richards, D. W.; Benedict, Ethel M., and Driscoll, Mary E.: J. Clin. Investigation **12**: 297 (March) 1933.

The syndrome of salt loss, dehydration and the resultant state of shock, typical of these disturbances, is characterized clinically by progressive weakness and overwhelming prostration, nausea and vomiting, increasing pulse rate with falling blood pressure, subnormal temperature, sunken eyes and loss of the normal turgor of the subcutaneous tissues. Examination of the blood shows an increase in the hematocrit; i. e., decrease in water content, decrease in the bicarbonate or chloride content of the serum or a decrease in both accompanying a fall in the sodium. When the development of this syndrome is rapid there is also an increase in urea, which appears before the final stages of oliguria or anuria develop.

The similarity of this syndrome to the picture of acute adrenal insufficiency in Addison's disease suggested the possibility that in this condition also the loss of salt and water might prove to be a significant factor.

E. C., a Negro man, admitted to the Presbyterian Hospital in May 1932, presented the typical picture of acute adrenal insufficiency. A study of the blood serum showed that the sodium content was reduced from the normal of 140 milliequivalents per liter to 109.5 milliequivalents per liter, a change even greater than that usually found in those conditions in which shock has been known to follow the loss of salt and water from the body. Chloride and carbonate were reduced in concentration, whereas potassium, sulphate, phosphate and serum protein were increased. The nonprotein nitrogen was 75.9 mg. per hundred cubic centimeters. The patient was treated with cortical extract prepared by Dr. R. Zwemer but died two days later. At autopsy the adrenal glands were found to be replaced by large tuberculous masses.

J. V., admitted to the hospital a week later, had equivocal mild Addison's disease. A chemical survey of the blood showed that the sodium concentration was slightly reduced, being 131 milliequivalents per liter. The blood chloride was also slightly decreased, but the other analyses were normal.

A third patient, M. W., admitted to the hospital in July 1932, was suffering from unmistakable Addison's disease. She was prostrated, the blood pressure was 85 systolic, 55 diastolic, and she vomited from time to time. The sodium content of the blood was only 123.5 milliequivalents per liter, and there was an equivalent reduction of chloride and bicarbonate. Except for a blood sugar of 73 mg. per hundred cubic centimeters, the other analyses were all normal. During the next week she went downhill rapidly with a diffuse bronchitis, and after seven days she was in a moribund condition, the blood pressure falling to 65 systolic, 48 diastolic. At this time the blood sodium had fallen to the amazing level of 107.8 milliequivalents per liter. The chloride and bicarbonate fell with the sodium, while the potassium, serum protein and nonprotein nitrogen increased.

On the basis of these observations it seemed probable that loss of salt and the resultant dehydration contributed to the state of shock, as in the other conditions that have been discussed.[8] In view of this fact, the patient was given 15 Gm. of sodium chloride by mouth and by rectum daily and received a single intravenous dose of 10 cc. of Eschatin, Parke, Davis & Co. (adrenal cortical extract made according to the method of Swingle and Pfiffner). After a week, she had regained sufficient strength to sit up in a chair. The sodium content of the serum had risen to 133 milliequivalents per liter, and there was a corresponding rise in chloride and bicarbonate. The potassium, nonprotein nitrogen, serum protein and hematocrit fell, and the blood pressure rose to 85 systolic, 65 diastolic. The patient went home and continued to take between 7 and 15 Gm. of salt daily in addition to her diet (chart 1). The patient remained quite well, doing most of her housework and walking a mile or so a day and occasionally dancing. The blood sodium had risen to the normal value of 139.5 milliequivalents per liter, and the blood pressure was about 100 systolic, 75 diastolic.

8. Loeb, R. F.: Science **76**: 420 (Nov. 4) 1932.

Whether salt and water replacement or a single dose of Eschatin had been responsible for the improvement, which continued at home, could not be finally settled until it could be ascertained whether salt withdrawal would induce adrenal insufficiency. The opportunity for our much desired observation finally presented itself. Slight puffiness about the eyes and mild edema of the ankles developed, and the patient was advised to follow a salt-poor regimen. One week later she was readmitted to the hospital with a history that after two days of salt withdrawal she became so weak that she had to go to bed. Weakness had been progressive and vomiting began on the third day of salt withdrawal. When she entered the hospital it was found that the blood sodium had again fallen to 126.8 milliequivalents per liter and the blood pressure was 86 systolic, 60 diastolic. At this time therapy consisted of the administration of salt alone, no cortical extract being used. Improvement was striking. Strength returned, blood pressure rose, vomiting ceased and after one week she was discharged, the blood sodium having risen to 138 milliequivalents per liter and the blood pressure to 122 systolic, 80 diastolic. At the present time, more than two years later, the patient is relatively well.[9]

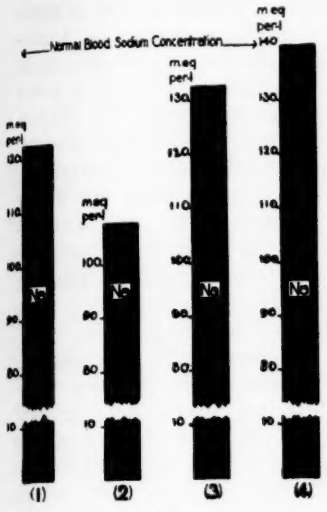

Chart 1.—Relation of symptoms to blood sodium concentration in Addison's disease. Before the administration of sodium chloride: (1) patient weak, nauseated and vomiting; (2) patient in a moribund condition. After the administration of sodium chloride: (3) patient much improved, walking about ward; (4) patient at home, doing part of the housework.

On the basis of these observations we could conclude (1) that the acute adrenal insufficiency of Addison's disease was associated with a sharp decrease in the sodium content of the blood and with dehydration, (2) that insufficiency had been induced in one patient by salt withdrawal and (3) that this state had been alleviated by salt administration.

The next step in this study was that concerned with the mechanism by which the sodium, the chloride and the bicarbonate concentrations of the blood were decreased in the acute adrenal insufficiency of Addison's disease. The question presented itself as to whether sodium was actually lost from the body with the development of adrenal insufficiency or whether its distribution within the body was merely altered. To answer this question, it was decided to resort to blood studies and electrolyte balance observations in the adrenalectomized dog. Marine and Baumann[10] had shown in 1927 that the sodium content of the blood of adrenalectomized cats was decreased while that of potassium was increased. Zwemer had confirmed these observations, but the fate of the lost sodium had not been established.

In the dogs studied by us,[11] the sodium content of the blood fell rapidly following the removal of the second adrenal gland. This change was accompanied by a drop in the level of chloride and bicarbonate. The balance studies showed a striking increase in sodium excretion by the kidneys (chart 2). This urinary loss of sodium proved that the changes in blood sodium concentration were due to actual sodium loss rather than to internal redistribution. Furthermore, the sodium excretion was sufficiently great to indicate that sodium must have been lost from interstitial fluid as well as from the blood stream. This might be expected from the equilibrium known to exist between blood serum and interstitial fluid. Not only was the total amount of sodium excreted by the kidneys increased after adrenalectomy, but also the concentration of this ion in the urine was definitely augmented in spite of the fact that the urinary volume was greater during the first four or five days after operation than in the control periods (chart 3). These results have since been confirmed by Harrop and his co-workers,[12] who have studied the effects of cortin withdrawal in adrenalectomized dogs.

The other changes observed in these animals can be summarized briefly. The chloride ion decreased in the blood after adrenalectomy, and chloride excretion was augmented. While the behavior of this ion approximately paralleled that of sodium, the changes were not correspondingly as great. The potassium content of the blood increased, although no consistent abnormality of potassium excretion could be determined by the balance studies. The increase in nonprotein nitrogen was marked following adrenalectomy, as was first observed by Marshall and Davis,[13] and it should be noted that this abnormality developed at a time when the urinary volume was greater than before adrenalectomy. In the light of these observations, it becomes apparent that nitrogen retention is not dependent on failure of urinary secretion as a result of hypotension. Furthermore, current explanations, which imply that this type of renal insufficiency results from a decrease in the water available for urinary excretion, are not valid.

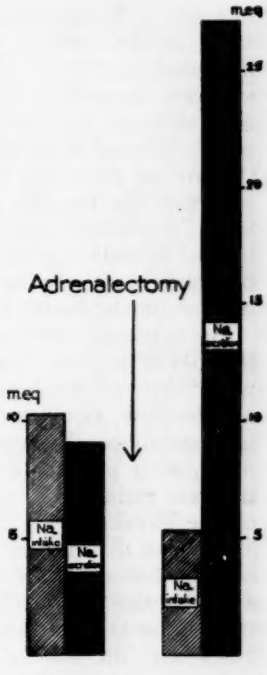

Chart 2.—Sodium loss following adrenalectomy in dogs. The great loss of sodium that follows adrenalectomy takes place through the kidneys.

Having established the fact that a decrease in sodium concentration in the blood occurs in Addison's disease and in adrenalectomized animals, and having shown in dogs, as Harrop[14] has since confirmed in man, that adrenal insufficiency is associated with a marked loss of sodium through renal excretion, we were next faced with the problem of the mechanism of this disturbance. At the present time, unfortunately, we must resort to the realm of speculation for an explanation. Several possibilities present themselves. First, it is conceivable that the removal or destruction of the adrenal glands is associated with the liberation of some foreign acid that calls on fixed base for its excretion, as is the case in diabetic acidosis.

9. Loeb, R. F.: Proc. Soc. Exper. Biol. & Med. **30:** 808 (March) 1933.
10. Marine, David, and Baumann, E. J.: Am. J. Physiol. **81:** 86 (June) 1927.
11. Loeb, R. F.; Atchley, D. W.; Benedict, Ethel M., and Leland, Jessica: J. Exper. Med. **57:** 775 (May) 1933.
12. Harrop, G. A.; Soffer, L. J.; Ellsworth, Read, and Trescher, J. H.: J. Exper. Med. **58:** 17 (July) 1933.
13. Marshall, E. K., and Davis, D. M.: J. Pharmacol. & Exper. Therap. **8:** 525 (Sept.) 1916.
14. Harrop, G. A.; Weinstein, Albert; Soffer, L. J., and Trescher, J. H.: The Diagnosis and Treatment of Addison's Disease, J. A. M. A. **100:** 1850 (June 10) 1933. Harrop, G. A.: Diagnosis and Treatment of Addison's Disease, Correspondence, J. A. M. A. **101:** 388 (July 29) 1933.

Ketone bodies usually play no part in adrenal insufficiency and Harrop[12] has shown that the lactic acid content of the blood is not increased in the dog suffering from hypo-adrenalism. Nevertheless, it is possible that some unrecognized organic acid might be present in amounts sufficiently great to produce the disturbances found.

Acidosis due to an organic acid should be associated with an increase in the excretion of urinary ammonia. Therefore the urinary ammonia excretion was studied in a patient with Addison's disease. As the patient drifted into marked insufficiency and while the blood sodium dropped from 135.3 milliequivalents per liter to 123.4 milliequivalents per liter, the ammonia excretion was normal and appeared to decrease slightly as insufficiency became acute. With the administration of salt and a simultaneous rise in the blood sodium to 138.1 milliequivalents per liter, the ammonia excretion increased slightly.[15] This year we[16] have followed the ammonia excretion in an adrenalectomized dog, kept alive with the aid of cortin and salt. When moderately severe adrenal insufficiency was allowed to develop in this animal there was certainly no increase in ammonia excretion and possibly a slight decrease. Thus it seems highly improbable that the loss of sodium is dependent on an acidosis due to an organic acid. Sulphate and phosphate ions may be retained in adrenal insufficiency but can hardly be held responsible for the loss of base.

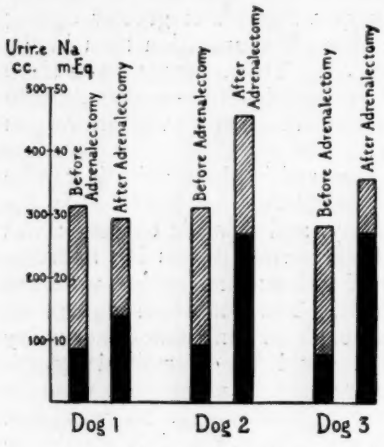

Chart 3.—Relative increase in sodium excretion in relation to water excretion after adrenalectomy in the dog.

As a second explanation, it might be assumed that the loss of sodium from the body is due to the loss of water through the kidneys. This hypothesis is untenable because, as has been mentioned, the loss of sodium is relatively much greater than that of water. Furthermore, with primary dehydration one would expect an increase rather than a decrease in the sodium content of the blood.

Perhaps the most attractive hypothesis which may be advanced at this time is that the adrenal cortex serves as a regulator of sodium metabolism. The locus of this action is uncertain, but the evidence at hand suggests that the adrenal cortical substance acts on the kidney to control the excretion not only of sodium but also of urea. In adrenal insufficiency the rate of salt excretion is increased while urea elimination is retarded. The concept that an internal secretion may control the metabolism of an inorganic ion is no longer unique. That the behavior of the phosphate and calcium ions is to a large extent regulated by the parathyroid secretion is established, and the influence of the thyroid gland on iodine metabolism is well recognized.

Before turning to the more practical aspects of the rôle of salt in Addison's disease, it may be of interest to mention one phase of the experimental work carried on during recent months.[16] We have made comparative studies of the effect of the withdrawal of salt and of cortin in an adrenalectomized dog. In both instances the sodium content of the blood falls and the urea concentration increases, as Harrop has also observed.[12] As might be anticipated, the changes are much more acute and more pronounced following the withdrawal of cortin, but the type of response is identical in the two instances (chart 4). When cortical extract is completely withdrawn, the sodium level cannot be maintained even with the administration of as much as 0.3 Gm. of salt per kilogram daily. This is a point that should be kept in mind in relation to the clinical course following the treatment of Addison's disease. Finally, it has been shown that salt may be completely withdrawn from the diet without inducing a fall in the blood sodium level or an increase in the urea content of the blood, provided a cortical extract of adequate potency is employed. Under these conditions the dog is in all respects as normal in his physiologic responses as is the animal with intact adrenal glands.

Of greatest interest to the clinician is the applicability of laboratory investigation to the diagnosis and treatment of disease. Most important is a critical analysis of the accuracy and limitations of the methods so employed. The first question that naturally comes to mind is concerned with the frequency with which the concentration of sodium in the blood serum is decreased. We have had the opportunity of making sodium determinations on the blood of sixteen patients with outspoken Addison's disease and in all but three the values were found to be definitely below normal.

These three patients were being treated with salt at the time, and in two of them a salt-poor regimen, instituted later, brought about a sharp drop in the blood sodium level. Thus, in our experience it may be stated that the decrease in sodium content of the blood in patients presenting themselves for treatment is a relatively constant finding, although the magnitude of the deviation from normal may be only slight in certain cases. Indeed, when the degree of damage to the adrenal cortex is relatively slight, it seems unlikely that any gross abnormality in sodium metabolism would be encountered. This view receives support from the fact that the removal of one adrenal gland is not attended by any significant physiologic disturbances. It must be emphasized that the decrease in the sodium content of the blood is not prima facie evidence of Addison's disease. Base loss forms a characteristic part of the clinical picture in a number of the pathologic states already discussed, as well as in certain others, and a low sodium level has also been found in a few critically ill patients without structural changes in the adrenal glands. Thus it is clear that the sodium concentration

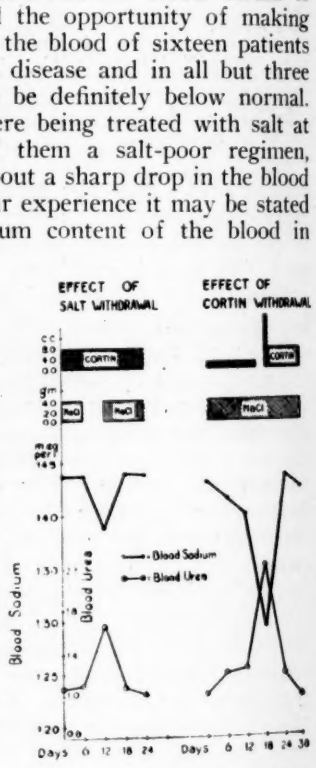

Chart 4.—Comparison of the effect of the withdrawal of sodium chloride and of cortin on the blood sodium and blood urea level in the adrenalectomized dog maintained on a constant diet.

15. Loeb, R. F.; Atchley, D. W.; Gutman, Ethel B., and Jillson, Ruth: Proc. Soc. Exper. Biol. & Med. **31**: 130 (Oct.) 1933.
16. Stahl, J.; Atchley, D. W., and Loeb, R. F.: Unpublished experiments.

of the blood, in spite of its diagnostic importance, is not an infallible criterion of the presence of Addison's disease.

The effect of salt withdrawal in one patient has been mentioned, and it has been pointed out that the same experiment carried out under the proper conditions in the dog is associated with a fall in the sodium content of the blood. We have used this reaction as a diagnostic test in six patients suffering from Addison's

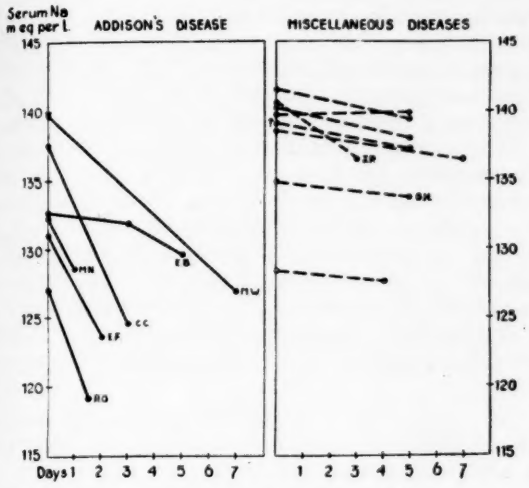

Chart 5.—Comparison of the effect of salt withdrawal on the blood sodium level in patients suffering from Addison's disease and certain other miscellaneous pathologic conditions.

disease, with quite consistent and at times alarming results (chart 5). The blood sodium level has fallen precipitously, as contrasted with that of patients suffering from other diseases, regardless of the initial values. Symptoms of profound weakness, prostration, nausea and vomiting, usually associated with a fall in blood pressure, develop in the course of from one to five days, and we are in complete sympathy with Harrop, who has warned against the dangers encountered with this procedure.

In one of our patients, E. B., the chain of events accompanying salt withdrawal, was sufficiently unusual to merit comment (chart 5). This patient had suffered from the classic signs and symptoms of Addison's disease for eight months. Weakness and anorexia had progressed rapidly in the two weeks preceding admission. The initial blood sodium level was 132.6 milliequivalents per liter and the blood pressure was 82 systolic, 60 diastolic. When given a salt-poor diet, she became slightly weaker and drowsier for four days and ate but little. At the end of the fifth day, her condition became suddenly critical. She could hardly move because of weakness; she was semicomatose, her pulse was almost imperceptible, and the blood pressure fell to 58 systolic, 50 diastolic. Curiously enough, the blood sodium had fallen to only 129.4 milliequivalents per liter, but the blood sugar concentration was as low as 48 mg. per hundred cubic centimeters, and a moderate ketosis had developed. She was given 25 cc. of cortical extract intravenously and frequent injections of epinephrine, and a continuous infusion of salt solution and dextrose was started. The next day her condition showed little change. The blood pressure was 62 systolic, 40 diastolic and the state of shock persisted. The blood sugar rose and remained at a normal level, the ketosis disappeared, but the blood sodium, despite salt and cortin therapy, fell to 124 milliequivalents per liter. The continuous infusions were kept up for seven days, and her general health improved greatly. At the present time she is eating satisfactorily, vomiting has stopped and strength has returned to some extent. She is taking 10 Gm. of salt daily in addition to her diet.

This case has been presented in detail because it demonstrates that the picture of acute adrenal insufficiency is a complex one and that, while the loss of sodium with its attendant dehydration is of apparently great significance, other factors may prove to be of vital importance in a given case. In this particular patient, shock developed with a fall of only 3 milliequivalents in sodium, a change not significant in itself, although the eventual deviation from normal was about 16 milliequivalents per liter. In spite of the administration of large amounts of cortin, fluid and salt, the state of shock was not altered in twenty-four hours and the blood sodium fell sharply. The factor of hypoglycemic shock was superimposed on the other disorders. This phase of adrenal insufficiency, which Britton [17] has stressed in his study of cats, is not, as a rule, striking in the dog and in the human being and may not be dependent on cortical insufficiency. Prompt alleviation of the hypoglycemia in this patient appeared to have little influence on the state of medical shock. Finally, ketosis entered into the complex picture and probably added to the state of dehydration. It is unfortunate that a diagnostic procedure so highly specific as is salt withdrawal in Addison's disease should be attended by such grave consequences to the patient.

A detailed discussion of the treatment of Addison's disease lies beyond the scope of this paper, but it is appropriate that reference should be made to the rôle of salt and cortin. The concept that salt solution is of value in the treatment of adrena insufficiency in animals and man is not new. In 1898 Soddu [18] first mentioned the fact that salt solution prolonged the survival of adrenalectomized animals, and this was confirmed by Banting and Gairns [19] in 1926. Marine and Baumann [10] in 1927 administered salt solution to cats because of the decreased content of sodium in the blood and obtained the same result. Many other investigators have more recently arrived at the same conclusion. In 1932 Rogoff [20] wrote that the intravenous administration of physiologic solution of sodium chloride "becomes an indispensable adjuvant in the treatment of Addison's disease with extracts representing the hormone of the adrenal cortex." The explanation offered by Rogoff was fallacious in that the salt solution was administered to correct an assumed "intoxication." It seems more rational on the basis of present knowledge to assume that the salutary effects may be ascribed to a replacement of salt and water, which are lost concomitantly with the development of acute adrenal insufficiency.

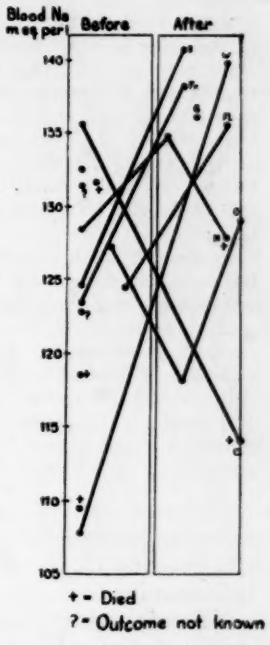

Chart 6.—Blood sodium values before and following the administration of sodium chloride in patients suffering from Addison's disease.

17. Britton, S. W., and Silvette, H.: Am. J. Physiol. **107**: 190 (Jan.) 1934.
18. Soddu, L.: Sperimentale **52**: 87, 1898.
19. Banting, F. G., and Gairns, S.: Am. J. Physiol. **77**: 100 (June) 1926.
20. Rogoff, J. M.: Addison's Disease, J. A. M. A. **99**: 1309 (Oct. 15) 1932.

The most convincing evidence for the value of salt as a therapeutic measure in adrenal disease in man, as well as in the adrenalectomized animal, is found in the fact that the withdrawal of salt may induce acute adrenal insufficiency and that frequently the only therapeutic measure necessary to relieve it is the readministration of sodium chloride. Nevertheless, it should be recalled that salt alone will not maintain the normal sodium level in the blood or cause indefinite survival of the completely adrenalectomized animal. In other words, a certain amount of cortical substance, either formed within the body or introduced from without, is essential to life. With this in mind it becomes obvious that salt will not relieve those individuals whose adrenal glands have been completely destroyed by disease.

Since the introduction of salt as a means of replacement therapy in our first case in 1932, we have treated and followed eight patients. The results have in reality been less confusing than might be judged from chart 6. Of the patients treated, two have died.

One of these, N., succumbed to a severe acute febrile illness with fever maintained at 105 F. for one week. She had active pulmonary tuberculosis and at autopsy the adrenal glands were found to be completely replaced by tuberculous tissue.

Patient C. had been in another hospital, for adrenal insufficiency, where he had been treated with salt for some months. He had tuberculosis of the right kidney and of both lungs. While under our observation, he remained quite well from the adrenal standpoint, and the blood sodium was maintained at a level of 135 milliequivalents per liter. His condition was so satisfactory that nephrectomy was contemplated. He was admitted to the wards for cystoscopy to determine the status of the other kidney. Following this manipulation, the temperature rose abruptly and never returned to normal. He was treated with salt and on one occasion with cortin, but he grew progressively weaker; the blood sodium continued to fall to a final level of 114 milliequivalents per liter after four months, at which time he died. At autopsy he had diffuse miliary tuberculosis and primary atrophy of the adrenal glands, only scattered cells being found after careful microscopic examination.

Patient O. has apparently active tuberculosis of the adrenal bodies. Salt withdrawal in this patient caused serious acute insufficiency associated with a sharp fall in the blood sodium content in thirty-six hours. Salt administration relieved the clinical symptoms, but it has not been possible to raise the sodium to a normal level in spite of the ingestion of 20 Gm. daily. During a period of increased fever, the sodium fell still further. In recent weeks, however, improvement in the sodium content of the blood has been encouraging and has accompanied a fall in the temperature.

It is of interest that any febrile episode in patients suffering from Addison's disease appears to decrease the function of the remaining adrenal tissue much as infection increases the severity of diabetes mellitus.

The remaining five patients are all taking between 7 and 10 Gm. of salt a day in addition to that of the diet. Their blood sodium levels remain within normal limits, and they are able to lead very much more active lives than before salt therapy was instituted. They will suffer from easy fatigability, they have occasional nausea, they feel the cold intensely, and pigmentation is little if at all changed. Our experience has shown that the optimum therapeutic dose of salt is variable and can be determined only by the method of trial and error. The clinical improvement of patients following the administration of salt has been confirmed by Harrop [14] and Snell [21] and a number of other investigators in recent months.

21. Snell, A. M.: Personal communication to the authors.

The successful treatment of Addison's disease will be accomplished only when the active principle or principles of the adrenal cortex become available for clinical use in high concentration and in a form that lies within the economic limits of sufferers from this disorder. At the present time numerous reports of treatment with cortical substance continue to enter the literature. Patients are said to "feel better" with this treatment and the blood pressure appears to rise, yet death from Addison's disease seems to be the ultimate outcome.

Although we have used a commercial preparation of cortical substance only occasionally, we have seen little objective evidence of beneficial effect. For example, one of our patients who had been maintained in the hospital on a regimen high in salt remained weak, and the blood sodium was fixed at a level of about 125 milliequivalents per liter over a period of many weeks. He was therefore given 4 cc. of a commercial preparation of cortical extract intramuscularly daily for four days and then 10 cc. daily for two days, without any effect on the blood sodium level. The fall in sodium in a patient who received 25 cc. of cortical extract in one day has been mentioned. Other examples might be cited. Perhaps our results may be best summarized as follows:

SUMMARY

If adrenal insufficiency in man is not relieved by salt administration, it will not be relieved by commercial cortical extracts given in the usual dosage. It is distinctly hopeful, however, for the future of this type of therapy that the commercial extract is entirely adequate for the healthy survival of the adrenalectomized dog.

The studies that we have presented indicate that there is a definite relationship between sodium metabolism and the active principle of the adrenal cortex. When cortical insufficiency develops, the disturbances in sodium metabolism manifest themselves in a number of ways that have significant diagnostic and therapeutic implications. The sodium concentration of the blood is decreased because of an increased rate of sodium excretion. The diagnostic change in the sodium level becomes more apparent and specific when salt is withdrawn from the diet. The withdrawal of salt, however, may result in an adrenal crisis dangerous to the patient. Conversely, the administration of salt will frequently alleviate acute adrenal insufficiency, and the continuation of this therapy mitigates to a considerable extent the signs and symptoms of Addison's disease. Finally, it should be recalled that, when destruction of the adrenal glands is complete, salt alone will not maintain life.

CONCLUSIONS

It should be emphasized once more that no attempt has been made to consider adrenal physiology in its entirety. There are many important and fascinating aspects of the problem, of which the work discussed constitutes but one.

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Mongolism.—All the known facts concerning mongolism seem to point to some condition in the ovary as underlying its pathogenesis. . . . We have a sufficient amount of circumstantial evidence, to borrow a legal term, to justify the speculation that foci of tissue change—perhaps scars—marking the sites of old ovulation are the cause of the trouble. Rosanoff, A. J., and Handy, Leva M.: Etiology of Mongolism, with Especial Reference to Its Occurrence in Twins, *Am. J. Dis. Child.* **48**:764 (Oct.) 1934.

MENTAL CHANGES ASSOCIATED WITH PERNICIOUS ANEMIA

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While in the literature there have been many accounts of involvement of the central nervous system in pernicious anemia, most of these have described only the cord changes. A few [1] have also mentioned cerebral symptoms, and there have been a fair number of reports concerned primarily with the mental changes. Mild mental changes with irritability as an outstanding feature are reported in as high as 40 per cent of cases, but frank psychoses are said to be rare, occurring in not more than 4 per cent.[2] The majority of writers assume the existence of a direct etiologic relationship between pernicious anemia and the associated psychosis, although a number stress the importance of heredity and psychogenic factors as well. Hackfield,[3] on the other hand, takes the view that there is no such fundamental etiologic relationship, and Musser and Wintrobe[4] say: "It is usually considered that major psychoses are predisposed to rather than a part of the disease pernicious anemia."

As long ago as 1905 the presence of psychoses in pernicious anemia was described by Langdon,[5] but, as Hackfield [3] says, previous to the introduction of liver therapy all the patients died and the only method of showing the relationship of the pernicious anemia to the psychosis was necropsy. The pathologic studies were not conclusive. Since the use of liver the effect of treatment on the psychosis has been observed but

TABLE 1.—*Analysis of Seventy-Six Cases of Mental Changes in Pernicious Anemia*

Total number of cases analyzed	76
From Milwaukee Sanitarium	7
From Milwaukee County Hospital for Mental Diseases	6
From Milwaukee County Asylum for the Chronic Insane	4
From case reports in the literature	59
Family and Past History of Mental Diseases	
Total cases in which data are given	52
Positive family or past history in	24
Correlation Between Blood Picture and Mental State	
Total cases in which data are given	34
Correlation present	8
Correlation absent	26
Results of Liver Therapy	
Total treated cases suitable for analysis	36
Deaths	10
Mentally unimproved	13
Mentally recovered	13

the reports have been diverse. Arguments against pernicious anemia being the primary cause of an associated psychosis are the following:

1. There is very often a family history or personal past history of mental disease.

2. The psychoses present no characteristics that clearly distinguish them from endogenous depressions or other well recognized mental disorders.

3. Mental improvement, when present, does not parallel the physical.

4. Autopsy shows no consistent relation between the pathologic changes in the brain and the psychosis.

Aside from mere association, the chief argument for the pernicious anemia having a causal relationship to the psychosis is the frequent occurrence of an "anxious-paranoid" picture, which, as Francke [6] says, "has been too often described in association with pernicious anemia to be a coincidence." The proponents of the theory that pernicious anemia is an important factor in the production of the associated psychosis admit that there is often no mental improvement under liver treatment but attribute this, as in the case of persistent cord symptoms, to the existence of irreversible pathologic changes.

TABLE 2.—*Treated Cases with Physical and Mental Improvement*

Case	Duration of Psychosis Subsequent to Treatment (in Months)	Correlation with Blood Picture (Approximate)
1	4	+
2	12	—
3	6	—
4	24	—
5	5	+
6	5	—
7	10	—
8	4	+
9	2	+
10	26	...
11	?	+
12	4	?
13	3	+

From the records of the Milwaukee Sanitarium I have gathered seven cases of pernicious anemia with associated mental changes. Through the courtesy of physicians at the Milwaukee County Hospital for Mental Diseases and the Milwaukee County Asylum for the Chronic Insane, I have examined records of ten additional cases. Through a personal communication and a search of the literature I have reports of fifty-nine other cases, thus making a total of seventy-six cases for analysis (table 1). In some of these the data are rather meager. In fifty-two cases both family history and past history are given, and there is in this group a personal or family history of mental disease in twenty-four. There is a family history of mental disease in nineteen of fifty-two, and a personal history of previous mental disease in six of fifty-five cases in which data are given. In thirty-four cases, fairly definite conclusions are possible as to the correlation between the blood picture and the mental state. In eight there appears to be a correlation and in twenty-six there does not.

When one comes to consider the effect of liver treatment on the psychoses, the material for analysis is more restricted. Quite a number of the collected cases antedate the era of liver therapy; a few show an obviously incidental relationship in that a chronic psychosis of the schizophrenic type existed for years before the development of pernicious anemia; a few show only mild mental symptoms and a few are classed as terminal psychoses. This leaves a group of thirty-six treated cases for more detailed analysis. Of the thirty-six patients, ten died. Three of the deaths were due to causes other than the anemia—pneumonia in two, and coronary disease in the third. The other seven patients failed to respond physically to liver treatment. Thir-

1. Goldhamer, S. M.; Bethell, F. H.; Isaacs, Raphael, and Sturgis, C. C.: Neurologic Changes in Pernicious Anemia, J. A. M. A. **103**: 1663-1667 (Dec. 1) 1934. Young, R. H.: Neurologic Features of Pernicious Anemia, ibid. **99**: 612-614 (Aug. 20) 1932.

2. Woltman, H. W.: The Mental Changes Associated with Pernicious Anemia, Am. J. Psychiat. **3**: 435-449 (Jan.) 1924.

3. Hackfield, A. W.: Studies of the Etiological Relationship Between the Somatic and Psychotic Disturbances in Pernicious Anemia, J. Nerv. & Ment. Dis. **76**: 31-48 (July) 1932.

4. Musser, J. H., and Wintrobe, M. M., in Tice, Frederick: Practice of Medicine, Hagerstown, Md., W. F. Prior Company, 1926. (New Section on Blood Disease, about 1930.)

5. Langdon, F. W.: Nervous and Mental Manifestations of Pernicious Anemia, J. A. M. A. **45**: 1635-1638 (Nov. 25) 1905.

6. Francke: Ueber Geistesstörungen bei perniciöser Anämie, Allg. Ztschr. f. Psychiat. **98**: 93-104, 1932.

TABLE 3.—*Pertinent Data in Seventeen Cases of Pernicious Anemia*

Number	Patient	Institution*	Age	Sex	Analysis of Blood (Lowest Recorded)			Free Gastric Acidity, Degrees	Cord Changes	Past History of Mental Disease	Family History of Mental Disease	Principal Psychotic Manifestations	Complications	Known Duration of Psychosis Before Discovery of Pernicious Anemia	Known Duration of Pernicious Anemia Before Onset of Psychosis	Known Duration of Psychosis After Beginning of Liver	Course of Psychosis	Response of Blood to Liver	Correlation of Blood Picture with Mental State	Period of Observation
					Hemoglobin, per Cent	Red Blood Cells, Millions	Color Index													
1	G. S.	A	60	♂	55	2.02	1.4	30	No	No	Yes	Mania confusion	None	0	0	No liver (preliver era)	Unimproved	No liver (transfusion)	No	4 months
2	S. V.	A	49	♀	75	2.90	1.3	?	Yes	Yes	No	Mania paranoid trend	None	0	0	No liver (preliver era)	Died	No liver (transfusion)	No	5 years
3	W. L.	A	43	♀	58	2.60	1.1	0	No	No	No	Depression	None	0	0	2 months	Recovered	Good	Yes	2 months
4	P. B.	A	66	♀	58	2.62	1.1	?	Yes	No	Yes	Paranoid trend	None	Some mental abnormality for 10 years	0	2 yrs., 7 mos.	Died	Poor	?	6 weeks
5	J. T.	A	61	♀	58	2.31	1.2	4	No	No	No	Depression	None	0	0	4 mos. (recurrence 1 yr. later)	Recovered, but recurred	Fair	No	2 yrs., 6 mos.
6	W. H.	A	60	♂	65	2.33	1.4	0	Yes	No	No	No psychosis, mild depression, irritability	None	..	..	..	Mild symptoms improved	Good	Yes	6 months
7	E. M.	A	47	♀	75	3.65	1.0	0	Yes	No	No	Paranoid trend, depression	None	0	0	5 months	Unimproved	Fair	No	5 months
8	M. R.	B	30	♀	45	1.33	1.7	?	No	Yes	No	Depression	None	0	4 months	2 yrs., 2 mos.	Recovered	Good	No	2 yrs., 2 mos.
9	M. Y.	B	76	♀	55	1.77	1.6	?	No	No	Yes	Confusion, impaired memory	Arteriosclerosis	0	0	10 months	Unimproved	Good	No	10 months
10	J. B.	B	64	♂	75	2.79	1.1	0	Yes	No	No	Impaired memory, loss of judgment, irritability	None	0	0	4 months	Died	?	?	4 months
11	E. M.	B	51	♀	40	1.62	1.3	?	No	No	Yes	Melancholia	None	5 months	0	4 years	Unimproved	Good	No	4 yrs., 5 mos.
12	G. P.	B	59	♂	..	2.93	...	?	Yes	No	No	Depression, paranoid trend, confusion	Hemiplegia	9 years	0	4 years	Unimproved	Good	No	1 yr., 4 mos.
13	B. W.	B (and A)	51	♂	80	2.41	1.6	?	Yes	No	No	Eccentricity, silliness, episodes of mania and depression	None	8 years	0	1 yr., 6 mos.	Unimproved	Good	No	8 years
14	B. W.	C	71	♀	..	0.80	...	?	No	No	No	Mania	None	0	0	3 years	Unimproved	Good	No	3 years
15	A. B.	C	58	♀	40	2.00	1.0	0	No	No	No	Diagnosis: paranoid dementia praecox	None	20 years	0	7 months	Slightly improved	Good	No	21 years
16	H. C.	C	52	♀	..	0.90	...	?	No	No	Yes	Diagnosis: paranoid dementia praecox	None	16 years	0	2 years	Unimproved	Good	No	10 years
17	M. W.	C	70	♀	..	2.00	...	?	?	No	Yes	Diagnosis: paranoid dementia praecox	Carcinoma of skin, metastases in abdomen	41 years	0	No liver (pernicious anemia diagnosed at necropsy)	Died	No liver	No	41 years

* Institution A, Milwaukee Sanitarium; Institution B, Milwaukee County Hospital for Mental Diseases; Institution C, Milwaukee County Asylum for the Chronic Insane.

teen patients of the surviving twenty-six had not improved mentally at the time the reports were made, although all but one had shown a good physical response. Three of these thirteen cases were complicated by arteriosclerosis. Four were considered to be dementia praecox. Another patient did not show a good physical response to liver and after being normal mentally for two years lapsed again into a depressed state. Another case had been observed for only one month at the last report. Of the remaining four cases that failed to show permanent mental improvement, two had shown a temporary change for the better. Thirteen patients recovered physically and mentally under liver treatment, but in these the duration of the phychosis showed a wide range from a minimum of two months up to twenty-six months, and in only six of the thirteen did the mental improvement approximately parallel the improvement in the blood picture (table 2).

Essential data of seventeen cases in Milwaukee are presented in table 3, and one case is here reported in detail.

REPORT OF CASE

W. L., a white woman, aged 43, married, had no history of previous mental illness. Her health had been good until an attack of influenza one year previously. Since then she had tired easily. No blood count was made before admission.

For two months the patient had been nervous. She worried, was easily upset and was "blue." Two weeks before admission she became ill with influenza and had pain in the right lower quadrant of the abdomen. A diagnosis of appendicitis was made but operation was not performed because of the influenza. The pain subsided in three or four days. Five days after the onset of the acute illness the patient showed some confusion and on the next day kept her eyes closed and would not talk. Following this she talked continually and cried a great deal. She was too distractible to eat so had to be fed, and she could not sleep without hypodermics. She thought God talked to her. Until the day of admission she was in bed, but then was brought to us by automobile from her home in northern Michigan.

The social history was irrelevant.

There was no family history of nervous or mental disease or other hereditary illness.

Physical examination showed the patient to be well developed and well nourished but very pale. The tongue was rather smooth, especially at the tip. A soft blowing systolic murmur was heard at the base of the heart. The spleen was not palpated. Slight edema of the ankles was noted. The deep reflexes were normal, and there was no Babinski reflex. A morbiliform rash was present over the abdomen, in the axillary fossae and faintly on the back.

The patient remained in bed but talked almost constantly in a low tone. Rarely she was more excited, jumped out of bed, ran into the hall, and even showed violence toward her nurse. Most of the time she was pleasant and cooperative but by spells was irritable and antagonistic. Her talk was incoherent and rambling. She appeared disoriented in all spheres and confused.

Laboratory examination showed: hemoglobin, 58 per cent; red blood cells, 2,600,000; white blood cells, 3,000; color index, 1+; marked anisocytosis and poiklocytosis; polymorphonuclear leukocytes, 69 per cent; lymphocytes, 27 per cent, monocytes, 2 per cent; eosinophils, 2 per cent; no free hydrochloric acid in the stomach contents; Wassermann reaction, negative; no abnormality of the urine.

There was a low fever on admission but this gradually subsided. The skin rash cleared entirely in a few days.

A diagnosis of pernicious anemia was made and liver therapy instituted. Steady gradual improvement of the blood picture followed, and the patient's color and strength improved.

During the first month, confusion continued to be an outstanding feature of the mental picture. People about her were misidentified and at times she had delusions that the food was poisoned, that there was dirt in her bed, and that the bed blankets were charged with electricity. She stopped eating toward the end of the fourth week but after two or three forced feedings began again to eat and from that time on made steady progress both physically and mentally. During her convalescence she was quiet, inactive and mildly depressed but gradually returned toward normal, so that two months after admission she was discharged as cured.

From this study one finds little unequivocal evidence to support the assumption that pernicious anemia can cause psychoses or that mental changes may be a manifestation of pernicious anemia in the same sense as may neurologic changes. Few patients with pernicious anemia develop psychoses, and, of those who do, almost half have a predisposition to mental illness as indicated by the family or past history. While a few of the cases, such as the one reported here in detail presenting the severe anemia and relatively prompt physical and mental recovery, might lead one to think that there is a close correlation between the physical and mental changes, the evidence is far from being conclusive. Failure of the mental symptoms to improve might be due in some instances to complications such as arteriosclerosis and in others may be explained on the theory of irreversible pathologic changes, but one would expect those cases in which the psychosis did clear to show a closer correlation between the physical and the mental improvement. In the recovered cases which I have cited, the duration of the psychosis in one case was two months and in one three months; but in the others the mental symptoms lasted four, five, six, ten, twelve and even twenty-four and twenty-six months. True, the mental symptoms might be slower to respond to treatment than the blood picture, but one would expect a more consistent mental response than I have been able to find.

The majority of the reported psychoses associated with pernicious anemia are of the anxious-paranoid type, but this does not necessarily indicate an etiologic relationship. In the first place the preponderance of acute over chronic types of psychoses may be only apparent, since the association of pernicious anemia with chronic psychoses would probably be presumed to be incidental and would not lead to the reporting of such cases. Secondly, the preponderance of depressive and paranoid manifestations in the reported cases may be explained, as has been suggested by several writers, on the ground that the physical symptoms of pernicious anemia, the weakness, paresthesias, incoordination, and so on, would serve to color the mood or form the basis for paranoid ideas. Manic psychoses in association with pernicious anemia are notably rare: only four of the seventy-six cases.

I conclude from this study that the association of psychoses with pernicious anemia is probably largely incidental.

EFFECT OF ANTERIOR PITUITARY-LIKE PRINCIPLE FROM THE URINE OF PREGNANCY

ON UNDESCENDED TESTES IN MAN

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During the last two years, several accounts of the treatment of cryptorchidism in man by pregnancy urine extracts have appeared in the medical literature. Schapiro [1] reported a group of cases in which the injection of anterior pituitary-like substance caused increased mobility of the testes. The details of treatment and the position of the testes were not given. Goldman and Stern [2] described two cases of unilateral undescended testis treated with commerical extract of pregnancy urine. In one case the testis descended into the scrotum but in the other it remained in the inguinal canal. These patients were also given thyroid substance and dried pituitary substance by mouth. Sexton [3] described six cases of so-called hypogenital condition treated with pregnancy urine extracts. In four of these, descent of a cryptorchid testis occurred during treatment. Rubinstein [4] described one case of bilateral cryptorchidism successfully treated in the same manner. Aberle and Jenkins [5] have carefully treated five cases. In only two of them did descent of the cryptorchid testis occur. The number of units of the pregnancy urine extracts used varied widely in each of these series. Aberle and Jenkins have analyzed their results and suggested that the failure of treatment may have been due to insufficient dosage, to the nutritional state of the child or to a mechanical block in the inguinal canal.

In spite of the apparently clearly defined cases in which descent of a cryptorchid testis occurred during the administration of pregnancy urine extracts, much skepticism has been expressed by physicians as to the efficacy of this form of therapy. Accordingly, the following additional series is presented in the hope of establishing further the rationale of the procedure and providing additional data as to dosage.

EXPERIMENTAL

Since July 1933, eleven cases of cryptorchidism have been treated by the injection of pregnancy urine extracts. These cases have not been selected and comprise all the available individuals with cryptorchidism. The position of the testes was checked by at least two different observers before treatment was begun. Attempts were made to measure the length and width of the testes, but these were later abandoned because of the inconsistency of the method. The pregnancy urine extract used was the commercially available "Follutein." [6] The injections were given by having the patients come into the clinic daily or they were administered by the family physician who referred the case. In each instance the initial dose was 25 rat units. This

This Investigation was supported by the Barbara Henry Research Fund.

From the New York Hospital and the Department of Medicine, Cornell University Medical College.

1. Schapiro, B.: Deutsche. med. Wchnschr. **56**: 1605 (Sept. 19) 1930.
2. Goldman, A., and Stern, A.: New York State J. Med. **33**: 1095 (Sept. 15) 1933.
3. Sexton, D. L.: Endocrinology **18**: 47 (Jan.-Feb.) 1934.
4. Rubinstein, H. S.: Endocrinology **18**: 474 (July-August) 1934.
5. Aberle, S. B. D., and Jenkins, R. H.: Undescended Testes in Man and Rhesus Monkeys, J. A. M. A. **103**: 314 (Aug. 4) 1934.
6. Supplied by the courtesy of E. R. Squibb & Sons.

was increased by 25 rat units daily until a 250 rat unit dosage was reached. This amount was then given daily for two weeks.

In the case of all boys over 11 years of age, an assay of the urine for "male" hormone was made prior to the beginning of the treatment and again approximately two weeks after the completion of the injections. Extraction of this hormone was done by the Womach and Koch[7] method. Assay was carried out on white leghorn capons. The combs were photographed daily under standard conditions and the area of the comb shadow was measured by a planimeter.[8]

The following case summaries give the condition of the patients before treatment and the details of the therapy:

CASE 1.—B. C., aged 6 years, weighing 17.7 Kg., was a normal looking boy with good general nutrition. The right testis could not be felt in either the inguinal canal or the scrotum. The left testis was normal. The penis was normal except for phimosis.

Injections of pregnancy urine extracts were begun on September 14. On September 29, after 2,000 units had been given, the right testis descended into the scrotum. On the previous day the child's father, who was a physician, had been unable to feel this testis either in the inguinal canal or in the scrotum. On September 30, the right testis was smaller than the left and very soft. Three weeks later, October 20, this testis was of the same size and consistency as the left one, although no further injections of pregnancy urine extract had taken place since September 30.

CASE 2.—C. T., aged 6½ years, weighing 18 Kg., had a normal general physique but was slightly underweight. The right testis was in the upper third of the inguinal canal. The left testis was in the scrotum in normal position. The penis was normal.

After the injection of 2,300 units of pregnancy urine extract over a three weeks period, the right testis descended into the normal position in the scrotum. Two weeks later it had increased in size until it was only slightly smaller than the left. Sensation was present and the testis was of a firm consistency.

CASE 3.—F. F., aged 9 years, weighing 37.7 Kg., had been overweight since the age of 6 and had always been considered healthy. When the child was 8 years of age his parents noted that he had a small penis and that both testes were absent from the scrotum. When he was 8½ years old, 300 rat units of "Antuitrin S" per week were administered for two weeks with no apparent effect. On physical examination, the child was found to be overweight. Neither testis could be felt, either in the inguinal canal or in the scrotum. The penis was infantile.

March 6, 1934, pregnancy urine extract injections were begun. March 29, after 3,600 rat units had been given, the right testis was in the scrotum and the left testis could be felt in the upper portion of the inguinal canal. April 12, after another 3,000 rat units of pregnancy urine extract had been given, the left testis was noted to lie high in the scrotum, while the right continued in the normal position. Therapy was discontinued. September 12, both testes were still in the scrotum and exhibited a firm consistency.

CASE 4.—P. E., aged 10 years, weighing 55 Kg., had poliomyelitis as a child. He had been overweight since the age of 7. Physical examination showed overweight. The penis was normal. The right testis was at the lower end of the inguinal canal and could be forced into the scrotum. The left was not felt, either in the scrotum or in the inguinal canal.

Injections of pregnancy urine extract were begun on June 7, 1934. July 1, after 3,700 rat units, both testes were in the scrotum. They were firm but still below normal size. Bilateral hernias were present, through which the testes could be pushed to their original position in the canal. Operative repair of these is being arranged.

CASE 5.—F. C., aged 11 years, weighing 38.2 Kg. was of normal general physique. The left testis was in the normal position in the scrotum. The right testis was not felt either in the inguinal canal or in the scrotum. The penis was normal.

After 2,400 rat units of pregnancy urine extract, given over a two weeks period, the right testis was found to be in the scrotum in normal position. It was approximately half the size of the left one. Ten days later, after daily injection of the extract, the right testis had increased in size until it was only slightly smaller than the left one.

CASE 6.—H. D., aged 11 years, weighing 44.2 Kg., was mentally defective. He had had no serious illnesses. He was a "fat baby" and had always been overweight. The right testis was in the normal position. The left one could not be felt either in the scrotum or in the inguinal canal. The penis was normal.

Injections of pregnancy urine extract were begun, February 5. February 20, after 1,900 rat units, the left testis was found to be in the scrotum. At that time it was less than half the size of the right testis. Injections were continued until April 26. At this time no difference in size or consistency of the two testes could be noted.

CASE 7.—A. H., aged 14 years, weighing 42 Kg., was normal looking and had had no serious illnesses. His general nutrition was good. The right testis was at the upper end of the inguinal canal. It could not be moved along the canal or expressed into the scrotum. The left testis was normal. The penis was normal and there was some growth of pubic hair.

After the administration of 4,000 rat units of pregnancy urine extract over a period of four weeks, the right testis was found to be in the normal position in the scrotum. It could, however, be pushed back through a hernial opening into its original position in the canal. The patient stated that it did not retract of its own accord. Arrangements are being made for operative repair of this hernia.

CASE 8.—B. B., aged 14 years, weighing 49 Kg., was of normal general appearance. The right testis was in the middle portion of the inguinal canal. The left was in the upper third of the inguinal canal. Both testes could be moved slightly but neither could be expressed into the scrotum. "Testicular sensation" was present in both. The penis was smaller than normal.

Injections of pregnancy urine extracts were begun on September 14. October 16, after 4,200 rat units had been given, both testes were in the scrotum in the normal position. They were smaller than normal but moderately firm.

CASE 9.—G. L., aged 15 years, weighing 64 Kg., had been followed in the clinic for several years. He had a chronic rheumatic endocarditis with mitral stenosis and insufficiency. In February 1933 a consulting urologist advised removal of an atrophic right testis, which could be felt in the upper end of the inguinal canal. The left testis was normal. The penis was normal.

Dec. 18, 1933, injections of pregnancy urine extract were begun. December 30, after 1,500 rat units had been given, he noted that the right testis was high in the scrotum. Injections were stopped. This testis, which at the time of its descent was soft and small, increased in size steadily. In June 1934 it was of the same size and consistency as the normal left one.

CASE 10.—M. L., aged 21, weighing 65 Kg., was a tall boy of the so-called hypogenital type. The right testis was in the scrotum but was small and soft. The left testis could be felt in the upper portion of the inguinal canal. The penis was small. The prostate was small and soft.

Pregnancy urine extract was begun, June 2. July 10, after 5,000 rat units, the left testis was found to be in the scrotum. There was slight increase in size in the right one and this testis was definitely firmer. Daily injections of the extract were continued until September 6, at which time both testes were firm but still below the normal size. There had been an apparent increase in the size of the prostate.

CASE 11.—W. S., aged 26 years, weighing 65 Kg., had an operation at the age of 11 for bilateral cryptorchidism. The right testis was placed in the scrotum. The left testis could not be found. General physical examination was normal except for a left inguinal scar and the absence of the left testis in the scrotum.

7. Womach, E. B., and Koch, F. C.: Proc. Sec. Internat. Cong. for Sex Research, p. 329.

8. These assays were aided in part by a grant from the Council on Therapeutics of the American Medical Association.

The patient was given 4,000 rat units of pregnancy urine extract over a period of one month. The left testis did not descend and no effect of the therapy was noted.

COMMENT

Of eleven cases of undescended testes which had been treated with pregnancy urine extract, the testes descended into the scrotum in ten instances during treatment. The one case in which failure occurred was a man of 26 who had had a previous exploration of the inguinal canal in an effort to locate the testis. Three of the cases were of bilateral undescended testes. In all these, both testes descended into the scrotum. In two instances, hernias persisted three months after the descent of the testes. Through these hernias the testes could be pushed back into the inguinal canal. Operative repair of the hernias will probably be necessary. In each instance the testes tended to increase in size after their descent into the scrotum. In three cases the recently descended testis could not on physical examination be differentiated from the normal one, three months after the cessation of treatment. The others remained smaller than normal. More striking than this increase in size was the change in consistency. All of them increased in degree of firmness.

TABLE 1.—*Summary of Cases*

Case	Age, Yrs.	General Appearance	Condition of Testis Before Treatment	Treatment, Pregnancy Urine Extract, Rat Units	Result
1	5	Normal	Right testis not felt, left normal	2,000	Descent of right testis into scrotum
2	6½	Underweight	Right testis upper third inguinal canal; left normal	2,300	Descent of right testis into scrotum
3	9	Overweight; penis small	Right testis not felt; left testis not felt	3,600 + 3,000	Right descended into scrotum; left descended into position high in scrotum
4	10	Overweight	Right testis in lower end of inguinal canal; left not felt	3,700	Right descended into scrotum; left descended into scrotum
5	11	Normal	Right testis not felt; left normal	2,400	Descent of right testis into scrotum
6	11	Overweight	Right testis normal; left not felt	1,900	Descent of left testis into scrotum
7	14	Normal	Right testis upper end of inguinal canal; left normal	4,000	Descent of right testis
8	14	Normal	Right testis middle portion inguinal canal; left upper third inguinal canal	4,200	Descent of both testes into scrotum
9	15	Chronic rheumatic endocarditis; overweight	Right testis upper end inguinal canal; left normal	1,500	Descent of right testis into upper portion of scrotum
10	21	"Hypogenital type"	Right testis in scrotum small; left upper portion inguinal canal	5,000	Descent of left testis into scrotum
11	26	Normal	Right testis brought to scrotum at age of 11 by operation; left testis not found at operation	4,000	No effect noted

Assays of the urine for "male hormone" of the five boys who were above the age of 11 years showed no definite change after therapy (table 2). This was to be expected, since all these patients except one had normal secondary sexual characteristics and in this one instance (case 10) the departure from normal was not extreme.

The dosage of the pregnancy urine extract used was greater in our cases than in most of the others previously reported. Beyond slight erythema at the site of injection, no reactions were encountered. With our system of dosage, descent of the testis usually occurred during the third week of treatment. It would appear that the time period over which the hormone is administered, as well as the total number of units given, is a factor.

Our results in the treatment of undescended testes with pregnancy urine extracts show a smaller percentage of failures than most of the reported cases. Although our cases were unselected, it is probable that there was an element of chance in determining the high percentage of cases in which descent occurred, since it is scarcely conceivable that in a certain group of cases the testes are not prevented from descending by a mechanical block such as the adhesions commonly found at operation. However, the incidence of successful descent was great enough to make it appear that this method of therapy should be tried before operative procedure is considered. Further, it would seem advisable to institute therapy at as early an age as possible, in order to prevent destruction of the spermatogenic function of the testis. Although spontaneous descent may occur up to the age of puberty, it does not appear desirable to wait until this time before starting therapy, since the testis may have already undergone considerable damage. The relatively large doses of pregnancy urine extracts and the time period over which they were given may have been important factors in bringing about the result.

TABLE 2.—*Assay of Urine for "Male" Hormone*

Case	Age	Male Hormone Before Administration of Pregnancy Urine Extract (Average Cock Units per 24 Hours)	Result	Male Hormone after Administration of Pregnancy Urine Extract for 1 Month (Average Cock Units per 24 Hours)
11	26	3.0	None	2.8
10	21	2.0	Left testis descended into scrotum	2.4
9	15	1.6	Right testis descended into scrotum	1.8
8	14	1.6	Descent of both testes into scrotum	2.0
7	14	2.0	Descent of right testis into scrotum	1.8

No conclusions could be reached in our cases in regard to the mechanism that was responsible for the descent of these testes. In two of the cases, hernias persisted and the testes could be expressed back into the inguinal canal, although they did not tend to assume this position spontaneously. The increase in size of the testis, which occurred in most instances after descent, may be an important factor in preventing its return to the abdominal cavity. Schloss [9] has suggested that the presence of "anterior pituitary-like" substances in the blood of the mother is responsible for the descent of the testes in man during fetal life. It would seem that the same mechanism, whatever it may be, can be instigated by substitution therapy in the child, and that its success depends on the absence of any mechanical block.

SUMMARY

Eleven cases of undescended testes in man were treated with a commercial extract of pregnancy urine.

9. Schloss, O. M.: Interpretation of Some Recent Advances in Medicine in Terms of Equilibrium, Am. J. Dis. Child. **46**: 1 (July) 1933.

Three of these patients had bilateral undescended testes. In ten of the cases, descent of the cryptorchid testes occurred during the period of treatment. No increase in the excretion of "male" hormone was noted after descent of the testes.

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BREATH ODORS FROM ALLIACEOUS SUBSTANCES

CAUSE AND REMEDY

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Offensive odor of the breath is often a matter of considerable importance to those afflicted, and medical advice is occasionally sought. The fact that the odor may arise from pathologic conditions in the structures of the mouth and respiratory tract is well recognized. But in many cases no definite pathologic changes are found. Moreover, the odor may not be present continuously but only during temporary periods of disturbed health or during menstruation.

It has been suggested that in such cases the substances causing the odor are of systemic origin; that the air in the lungs is tainted by aeration from the blood, or in the mouth from secretion of the substances into the saliva; or, again, that the odor arises directly from the stomach. It is more probable, however, as the evidence to be here presented also indicates, that generally the source of the odor is not systemic but local in the mouth or respiratory tract. Determination of the source is essential to any therapy.

As a phase of the problem that is directly amenable to experimental study, we have investigated the source of the odor arising after eating onion or garlic.

It is well known that there exists among different individuals wide differences in the intensity and particularly in the persistence of the odor on the breath after eating onion or garlic. Usually the breath loses its odor within a few hours, but in occasional individuals even small amounts of onion or garlic inadvertently eaten in salads, soups or sauces taint the breath for several days. Moreover, in such cases the odor often loses its typical alliaceous character after some hours have passed and, although the breath is offensive, it is difficult to identify precisely the nature of the odor. As a rule in the past little relief could be given for this condition except by disguising the odor with the use of mouth washes containing aromatic oils.

The odor from onion and garlic is due to the essential oils contained in these vegetables. That of onion is mainly allyl-propyl disulphide, $C_6H_{12}S_2$; this oil appears in garlic in small amounts, but the main constituent of the distillate from garlic is diallyl disulphide, $C_6H_{10}S_2$.[1] In addition to these main constituents there are both lighter and heavier fractions of sulphur bearing oils of uncertain chemical composition but all possessing disagreeable odors.

The taint on the breath after eating onion or garlic is due to the presence of these essential oils or their decomposition products in the expired air. Considerable uncertainty has existed, however, as to the manner in which the oils are discharged into the expired air. Four theories have been advanced:[2]

1. That the oils pass into the blood stream during digestion, are then aerated from the blood in the lungs, and so pass into the expired air. For certain volatile substances such as ether, alcohol and acetone this passage from the blood to the air in the lungs is well established. This theory is the one commonly accepted also to explain the source of the odor on the breath after eating onion or garlic; occasionally it is amplified by the addition of a hypothetic secretory activity of the respiratory mucosa by which the oil is believed to be selected from the blood and passed into the air—presumably to account for the fact that the blood, following digestion of garlic, has not been observed to smell of the oil.

2. That the essential oil appears in the saliva by secretion from the blood passing through the salivary glands.

3. That the odor passes from the stomach by way of the esophagus (other than during eructation) and enters the breath through this channel.

4. That possibly the odor arises in part from particles of onion or garlic retained about the teeth, the tonsils and the papillae of the tongue. Considerable attention has been given to pathologic conditions in the structure of the mouth and pharynx as sources of odor on the breath, but no one has advanced the idea that after eating onion or garlic the odor arises solely from particles retained in this locality. We, however, do advance such a theory and moreover we here substantiate it with experimental demonstration. The localization of the source of the odor to the mouth structure opens up a possibility of a remedy. No known measure could control the passage of the oils from the blood or saliva to the expired air or prevent their passage from the stomach; it is possible, however, as we shall show, to rid the mouth of the alliaceous oils.

The only extensive experimental work carried out to determine the disposition of alliaceous essential oils in the body was that of Lehmann.[3] He estimated the amount of garlic oil appearing in the breath of rabbits after administering the oil subcutaneously, intravenously, rectally and orally. For analytic determination he passed measured amounts of the expired air through hundredth normal permanganate solution and titrated with hundredth normal oxalic acid solution. The doses of oil he used were enormous, from 4 to 5 cc. of the juice pressed from garlic and containing from 8 to 10 mg. of the essential oil. This amount would be equivalent to 6 or 8 Gm. of the vegetable. Such a dose given to a rabbit weighing 1.5 Kg. would correspond to 300 or 400 Gm. of garlic given to a man.

Following subcutaneous injection, no oil was detected in the expired air. Following intravenous injection in which the juice was administered over a period of thirty-eight minutes, the expired air gave traces of the oil for a period of fifty minutes; after that time no more appeared on the breath—obviously an effect quite different from the persistent taint observed on the human breath after eating garlic. Following adminis-

From the Laboratory of Applied Physiology, Yale University.

1. Parry, E. J.: The Chemistry of Essential Oils, London, D. Van Nostrand Company, 1908, pp. 190-191.

2. Boas, I.: Ueber Foetor ex ore et lingua und dessen Behandlung, Therap. d. Gegenw. **70**: 10 (Jan.) 1929. Kemler, J. I.: Halitosis, M. J. & Rec. **136**: 230 (Sept.) 1932. Lederer, W. J.: Fetid Breath, M. Rec. **73**: 58, 1908. French, H.: Foulness of the Breath: An Index of Differential Diagnosis, ed. 3, New York, William Wood & Co., 1923.

3. Lehmann, F. A.: Untersuchungen über Allium satirum (Knoblauch), Arch. f. exper. Path. u. Pharmakol. **147**: 245, 1930.

tration to the stomach by means of a tube, the amount of oil appearing in the expired air was so slight as to fall within the limit of the error of the method of analysis, definitely less than 1 per cent of the oil appearing in the breath in spite of the massive dose that had been given.

Lehmann's work really offers no support to the belief that the odor on the breath after eating ordinary amounts of onion or garlic comes from the blood by way of the lungs or salivary glands or from the stomach through the esophagus. It offers no explanation for the persistent odor on the breath after the vegetables are eaten.

We have approached the problem in another manner and with an experiment that is crucial. One and five-tenths grams of raw garlic was chewed and swallowed; the breath was immediately rendered foul and remained so for more than twenty-four hours. When the odor was no longer detectable, the same amount of garlic was chopped into small particles and inclosed in gelatin capsules; the capsules were swallowed. No odor whatever was detected on the breath at any time during the next twenty-four hours. The only exception occurred when, during the first three hours after eating the garlic, the subject belched; only momentarily then was the breath rendered foul by the odor from the stomach—indicating beyond question that the capsules had dissolved and discharged their contents.

Several repetitions of these experiments gave in each case the same results. Moreover, the substitution of 20 Gm. of onion for the garlic (in a correspondingly larger number of capsules) gave the same results as those obtained with garlic.

The conclusions appear obvious: the odor of onion or garlic on the breath does not come from the blood stream, from the salivary glands or from the stomach (except at the moment of eructation); it comes instead as an emanation from particles retained by the structures in and about the mouth.

The experiments were amplified by quantitative analysis of the expired air for the following reasons:

1. To substitute actual numerical values for the rough subjective impressions obtained by merely smelling the breath.

2. To allow a critical study of the effect of certain deodorants on the sources of the odor in the mouth. Quantitative methods were particularly desirable in regard to the latter study, for if the deodorant itself possess an odor it is difficult to tell by the sense of smell whether the onion odor is removed or merely masked.

There is no highly sensitive quantitative method of analysis specific for onion or garlic oil. The iodine pentoxide method for estimating volatile organic substances, previously described in papers from this laboratory,[4] for use in determining small amounts of ether, alcohol and carbon monoxide, is much more sensitive than the permanganate method used by Lehmann. Neither method is specific for onion or garlic oil but responds to all oxidizable organic vapors. This disadvantage was overcome, however, by determinations made on the breath of the subject prior to each experiment to show freedom from all such substances. Likewise in testing deodorants it was necessary to carry out suitable control experiments to prove that no volatile organic substance appeared from the deodorant.

In this method of analysis the air containing the organic vapor is drawn by suction through a tube packed with alternate layers of glass wool and iodine pentoxide (I_2O_5) heated in an electric oven to a temperature of 180 C. The vapor is oxidized; the iodine (in some cases also hydriodic acid) [4c] liberated passes on in the stream of air and is collected in an aqueous solution of potassium iodide and titrated with standardized thiosulphate solution in the presence of starch.

Theoretically, 1 mg. of the diallyl disulphide from garlic should yield 5.8 mg. of iodine; and 1 mg. of the allyl-propyl disulphide from onion, 6.09 mg. of iodine. Both onion and garlic contain, in addition to these main volatile ingredients, closely allied odoriferous organic sulphur compounds of greater or lesser volatility. The method of analysis was therefore standardized against the distillate from the vegetables rather than from the commercial oils. To this end a carefully weighed piece of the vegetable (in each of several experiments averaging about 0.1 Gm.) was placed in a small flask through which passed the stream of air leading to the tube containing the heated iodine pentoxide. The flask was heated by immersion in a water bath. All connections in the circuit were made glass to glass to avoid exposure of rubber tubing that might absorb the oils distilled from the onion or garlic. Twenty minutes sufficed to remove all the oil from the vegetable as shown by cessation of iodine liberation from the pentoxide.

The results from four experiments carried out on garlic gave closely corresponding results with an average of 10.93 mg. of iodine liberated per gram of garlic. This amount of iodine corresponds theoretically to 19 mg. of diallyl disulphide (all of the oil considered to be in this form) thus indicating a yield of 0.19 per cent. The yields of oil collected from crude distillation of garlic are only about half this amount.[5] By the method employed here a higher yield would be expected, since there is no loss from failure of condensation of even the most volatile fractions.

The same procedure carried out for onion gave 2.98 mg. of iodine per gram of onion or, calculated as allyl-propyl disulphide, 0.049 per cent of oil.

As judged from the sense of taste there is considerable variation in the content of essential oil in different onions, but probably less difference in garlic. The onion used throughout the experiments reported here was an ordinary culinary onion of domestic growth, of medium size and fairly pungent.

In the first series of quantitative experiments, 1.5 Gm. of garlic was chewed and swallowed. Five minutes later and each hour following for a period of six hours, a measured amount of expired air (from 5 to 15 liters) was passed through the iodine pentoxide and the liberated iodine collected and titrated. To obtain the measured amount of air a tube of large bore connected to the pentoxide container was held in the mouth and closed by the tongue during inspiration but left open during expiration; beyond the absorber containing the potassium iodide for collection of the liberated iodine, a gas meter was placed in the circuit; the effluent passage of the meter was attached to the

4. (*a*) Henderson, Yandell; Haggard, H. W.; Teague, M. C.; Prince, A. L., and Wunderlich, R. M.: Appendix 4: Report of Tunnel Gas Investigations, States of New York and New Jersey, p. 203. (*b*) Haggard, H. W.: An Accurate Method of Determining Small Amounts of Ethyl Ether in Air, Blood and Other Fluids, J. Biol. Chem. **55:** 131 (Feb.) 1923. (*c*) Haggard, H. W., and Greenberg, L. A.: Studies in the Absorption, Distribution and Elimination of Ethyl Alcohol: I. The Quantitative Determination of Ethyl Alcohol in Air, Blood and Urine by Means of Iodine Pentoxide, J. Pharmacol. & Exper. Therap. **52:** 137 (Oct.) 1934.

5. Parry.[1] Lehmann.[3]

suction pump, which drew the stream of air through the analyzer train. During each expiration about 50 cc. of air was drawn through the pentoxide; when the meter registered the desired total, fresh air was passed through the train for five minutes in order to flush it.

The results of three experiments, in each of which 1.5 Gm. of garlic was eaten, are given in table 1, which also shows the results from the second and third series of experiments. It will be seen that, five minutes after the garlic was eaten, each liter of expired air contained from 0.0028 to 0.0035 mg. of oil, recorded as diallyl disulphide.[6] One hour later the content had fallen to only 0.0008 to 0.001 mg. Thereafter the decline was gradual; six hours after eating the garlic the breath contained from 0.00015 to 0.00025 mg. of the oil. This amount was easily detected by the sense of smell.

As a control on these experiments, a second series was carried out in which 1.5 Gm. doses of garlic were swallowed in capsules. In no instance was the slightest trace of oil found in the expired air.

In each of a third series of experiments, 1.5 Gm. of garlic was chewed and then as completely as possible spit out; the mouth was rinsed with water and the concentration of essential oil in the expired air estimated as in the previous experiments. The amounts found were almost identical with those of the first series in which the garlic was chewed and swallowed.

A somewhat different procedure was carried out for onion: In the first experiment 2 Gm. was eaten and the oil in the expired air determined as in the case of garlic; in the second experiment the procedure was repeated except that 20 Gm. of onion was eaten. If all the odor arose from particles retained in the mouth, the total amount of onion eaten should make little difference in the odor given off, since only a limited amount can be retained in the structure about the mouth. If, on the other hand, the oil passed into the breath from the blood stream, the amount in the breath

TABLE 1.—*Essential Oil Found in the Expired Air*

	After 1.5 Gm. of Garlic Was								
	A Chewed and Swallowed: Mg. of Oil per Liter of Expired Air			B Enclosed in Gelatin Capsules and Swallowed: Mg. of Oil per Liter of Expired Air			C Chewed and Spit Out: Mouth Rinsed with Water: Mg. of Oil per Liter of Expired Air		
	Experiments			Experiments			Experiments		
Time	1	2	3	1	2	3	1	2	3
5 minutes	0.0028	0.0035	0.0032	000	000	000	0.0026	0.0031	0.0025
1 hour	0.0008	0.0010	0.0008	000	000	000	0.0009	0.0008	0.00075
2 hours	0.0005	0.0005	0.0006	000	000	000	0.0005	0.0004	0.0004
3 hours	0.0003	0.0003	0.0004	000	000	000	0.0004	0.0004	0.00035
4 hours	0.0003	0.00025	0.0003	000	000	000	0.0004	0.0003	0.0003
5 hours	0.0002	0.00025	0.00025	000	000	000	0.0002	0.0003	0.00015
6 hours	0.0002	0.00025	0.00015	000	000	000	0.00015	0.0003	0.00020

should be proportioned to the amount eaten. Five minutes after the eating of 2 Gm. of onion the breath contained 0.0005 mg. of oil, calculated as allyl-propyl disulphide, per liter of air; five minutes after the eating of 20 Gm. of onion it contained 0.00056 mg. of oil—essentially the same amount. Four hours later these amounts had fallen to 0.00002 and 0.00003 mg. respectively; the odor was still detectable by the sense of smell.

The relative amounts of oil found in the breath after the eating of onion and garlic are approximately in the proportion of 0.0005 and 0.0030 respectively, or 1 to 6. These values correspond approximately to the relative amounts of oil obtained by direct distillation of these two vegetables and given in the foregoing as respectively 4.9 and 19 mg. per gram.

From these observations it is clear that the source of odor after eating onion and garlic is from particles retained in the mouth structure. If so it should be possible to remove or deodorize these particles. Brushing the teeth has often been advocated in overcoming

TABLE 2.—*Effects of Certain Procedures on the Removal of Garlic Odor from the Expired Air* *

	Teeth and Tongue Brushed and Mouth Rinsed with:						
	A Soap and Water: Mg. of Oil per Liter of Expired Air		B 30 per Cent Solution of Alcohol: Mg. of Oil per Liter of Expired Air		C Solution of Chloramine: Mg. of Oil per Liter of Expired Air		
Time	1	2	1	2	1	2	3
5 minutes	0.0034	0.0027	0.0023	0.0033	0.0036	0.0027	0.0029
1 hour	0.0012	0.0008	0.00075	0.0009	0.0011	0.0008	0.0009
1½ hours	0.0008	0.0006	0.0005	0.0006	0.0008	0.00065	0.0007
2 hours	0.0006	0.0005	0.0004	0.0006	000	000	000
3 hours	0.0004	0.0004	0.0004	0.0004	000	000	000
4 hours	0.00025	0.0004	0.0003	0.0005	000	000	000
5 hours	0.0003	0.0003	0.0002	0.0003	000	000	000

* In each experiment, 1.5 Gm. of garlic was chewed and swallowed; the amount of essential oil in the breath was determined at intervals as indicated; the procedure intended to deodorize the mouth was applied one and one-half hours after the garlic was eaten.

the odor of onion. To test this procedure quantitatively, 1.5 Gm. of garlic was chewed and swallowed and the amount of essential oil in the expired air determined five minutes, one hour and one and one-half hours later. During this time the concentration of the oil had fallen to the plateau level (as shown in experiments of series A and C, table 1) in which its further course could be predicted. The teeth and tongue were then brushed with soap and water and the mouth rinsed. The commercial dentifrices were avoided here because the essential oils which they contain liberate iodine from the pentoxide. As seen from experiment A in table 2, no marked decrease in the garlic odor was obtained with the use of soap and water.

From previous work in this laboratory with chlorine in the destruction of organic odors,[7] attention was turned to the possibilities of this substance in the form of chloramine. After garlic had been eaten the teeth were scrubbed, the tongue brushed and the mouth rinsed with a solution made by dissolving one 4.6 grain (0.3 Gm.) chloramine[8] tablet in each 30 cc. of water. Particular attention was paid to the tongue, for the papillae at the base of this structure have long come under suspicion as a source of odor from retained food particles.[9] No odor of garlic could be detected on the

6. Actual numerical values are of significance only in showing the rate at which the odor leaves the breath; there are undoubtedly wide variations in the amount of oil found on the breath of different subjects.

7. Henderson, Yandell, and Haggard, H. W.: The Elimination of Industrial Organic Odors, J. Indust. & Engin. Chem. **14**: 548, 1922. The use of chlorine water in deodorizing the nose and mouth is described by French, as quoted in Solis-Cohen, Solomon and Githens, T. S.: Pharmaco-Therapeutics, New York, D. Appleton Company, 1928, p. 537. Suspension of chlorinated lime in water, dilute chlorine water, or a solution of chloramine in water, as described later, will rid the hands of the odor from onion or garlic. The senior author was able to remove quickly from the skin all trace of the odor from the discharge of a skunk (accidentally received) with the use of a strong suspension of chlorinated lime in water.

8. Paratoluene sodium sulphonchloramide, Chloramina, U. S. P. The tablets used here were those prepared by the Abbott Laboratories and bearing the name Chlorazene.

9. Hopmann, Eugen: Uebler Mundgeruch, München. med. Wchnschr. **79**: 1895 (Nov. 4) 1932. Wagner, Richard: Zungenreiniger zur Behandlung üblen Mundgeruches, ibid. **79**: 2049 (Dec. 16) 1932. Prinz, H.: Halitosis: Cause and Prevention, Dental Cosmos **72**: 700, 1930.

breath but there remained a slight odor from the chlorine products. The question of whether the garlic odor was actually destroyed or simply masked was determined by analysis of the expired air.

Experiments were carried out first as controls to determine whether the chlorine odor liberated iodine from the pentoxide. The expired air of a subject who had not eaten garlic was first passed over the pentoxide to confirm the absence of any organic vapors. Next the teeth and tongue were washed and the mouth rinsed with the chlorine solution. The expired air was again passed over the pentoxide. No iodine was liberated; the chlorine odor did not affect the pentoxide.

In each of three experiments, series C of table 2, 1.5 Gm. of garlic was chewed and swallowed and the amount of oil in the expired air followed for one and one-half hours as in the case of experiments of series A, table 2. During this time the oil had risen to concentrations ranging from 0.0027 to 0.0036 mg. per liter and fallen to the plateau level of from 0.0008 to 0.0011 mg. The mouth was then treated with chloramine solution as described. Repeated analyses during the next three hours showed absence of oil in the expired air. The chlorine products had deodorized the garlic particles.

Two additional experiments were carried out in which, after garlic had been eaten, the teeth and tongue were brushed and the mouth rinsed with 30 per cent solution of alcohol in water. Control experiments demonstrated that the vapors of alcohol, after the mouth had been washed with this substance, persisted in the breath for only fifteen to twenty minutes. In some proprietary mouth washes recommended for the removal of onion odor the only possible deodorant is the alcohol, which might conceivably dissolve and remove the essential oils. Our experiments, series A, table 2, show that alcohol is without effect on the garlic odor. It would appear that the only effective part played by proprietary mouth washes containing alcohol is in masking the breath by the odor of the essential oils with which they are flavored and which are held in solution by the alcohol.

CONCLUSIONS

The odor given to the breath by onion or garlic comes from the essential oil contained in these vegetables.

The oil does not, as has been suggested, reach the breath from aeration of the blood in the lungs, from pulmonary secretion, from salivary secretion, or in air passed from the stomach. It arises solely from particles of onion or garlic retained in the structure about the mouth.

Quantitative experiments demonstrate this fact.

The particles from which the odor arises can not be removed completely by mechanical means; brushing the teeth and tongue and washing the mouth with soap and water fail to deodorize the breath. Similarly washing the mouth with a 30 per cent solution of alcohol is ineffective.

The breath can be immediately and completely rid of the odor by washing the teeth and tongue and rinsing the mouth with a solution of chloramine. The chlorine liberated in the mouth reacts chemically with the essential oils and deodorizes them.

It is probable that many cases of foul breath from other causes would be amenable to the same method of treatment.

DIABETES MELLITUS AND HYPERTHYROIDISM

REPORT OF A CASE WITH A FASTING BLOOD SUGAR OF 1,500 MG. PER HUNDRED CUBIC CENTIMETERS IN THE ABSENCE OF COMA

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This case is presented to record a fasting blood sugar of 1,500 mg. per hundred cubic centimeters in a diabetic patient without coma but manifesting all the signs and symptoms of marked hyperthyroidism. An extreme hyperglycemia of this degree has been observed infrequently in diabetes (the literature is summarized in the table); not one of the published cases was complicated by thyrotoxicosis. As far as I could learn, this is the only case on record of diabetes complicated by hyperthyroidism showing a blood sugar over 1,000 mg. per hundred cubic centimeters without any signs of coma, although in the present case coma undoubtedly was impending.

REPORT OF CASE

Mrs. L. J., white, aged 43, a seamstress, seen Sept. 13, 1929, complained of pruritus vulvae and vulvar boils. One month previously there had been a surgical intervention for an infected finger, and at that time sugar was found in the urine. The past, personal and family histories were irrelevant.

Physical examination showed that the patient was 14 pounds (6.4 Kg.) overweight, that there was slight recession of the gums, that the tonsils were irregular, and that systolic murmurs were present at the apex and base of the heart; otherwise the examination revealed nothing of note. The urine showed a specific gravity of 1.017, no sugar, no diacetic acid and no albumin; microscopic examination was negative. Blood chemistry showed: fasting blood sugar, 167 mg. per hundred cubic centimeters; urea nitrogen, 12.4 mg., and plasma cholesterol, 169 mg.

The patient was given a diet containing 80 Gm. of carbohydrate, 60 Gm. of protein and 140 Gm. of fat (total calories 1,820). The diet was well tolerated and the urine remained free from sugar without the use of insulin. Her condition remained practically unchanged until July 1932, when she complained of palpitation and loss of weight.

Physical examination at this time revealed moderately prominent eyeballs, tremor of the fingers, an irregular and nodular enlargement of the thyroid gland and auricular fibrillation. The basal metabolic rate was plus 42 per cent; the fasting blood sugar was 227 mg. per hundred cubic centimeters. A diagnosis of hyperthyroidism complicating diabetes mellitus was made. Measurable quantities of sugar appeared in the urine and from 8 to 16 units of insulin was prescribed daily. Thyroidectomy was advised but refused by the patient. Roentgen treatments of the thyroid were instituted in its place and in January 1933, following five exposures, the basal metabolic rate fell to plus 8 per cent. In spite of the decrease in the basal metabolic rate, increasing quantities of insulin were required to keep the urine free from sugar. In July 1933, because of gain in weight, a diet containing 65 Gm. of carbohydrate, 80 Gm. of protein and 40 Gm. of fat (total calories 940) was ordered; at this time, she was taking 38 units of insulin daily.

In September 1933, following a vacation of two months in the country with more or less self treatment, she returned to the office complaining of weakness, palpitation and marked loss in weight. The pulse rate was 134 per minute and completely irregular. The skin was dehydrated and the eyeballs were moderately soft. There was a slight acetone odor to the breath. The night and morning urines showed 5 and 3.6 per cent of

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sugar, respectively, and appreciable quantities of acetone in both. The fasting blood sugar was 1,500 mg. per hundred cubic centimeters (checked and rechecked by the method of Folin and Wu), the plasma cholesterol 675 mg. and the basal metabolic rate plus 59 per cent. A temporary dietary change and increased insulin dosage were instituted, and the patient was admitted to the New York Post-Graduate Hospital the following day.

The subsequent course may be summarized briefly as follows: Glycosuria, acetonuria and loss in weight persisted for several days following admission to the hospital, in spite of an increase in the diet to 230 Gm. of carbohydrate, 75 Gm. of protein and 300 Gm. of fat (total calories 3,920) and 210 units of insulin daily. Ten days following admission the basal metabolic rate had fallen to plus 20 per cent and the fasting blood sugar ranged from 210 to 255 mg. per hundred cubic centimeters.

October 5, a subtotal bilateral resection of the thyroid gland was performed by Dr. C. G. Heyd. The examination of the excised thyroid gland revealed multiple adenomas.

The postoperative course, especially for the first few days, was stormy but the patient eventually made a good recovery and was discharged from the hospital seventeen days following the operation. For three days prior to her discharge the urine was free from sugar on a diet containing 100 Gm. of carbohydrate, 70 Gm. of protein and 90 Gm. of fat (total calories 1,490), and 45 units of insulin daily. Since November 1933 she has been followed in the metabolic clinic of the New York Post-Graduate Hospital, and her condition has been entirely satisfactory to the day of writing. The last study, carried out approximately one year following the thyroidectomy, showed the weight average normal, basal metabolic rate minus 6 per cent, pulse 78 per minute and regular, and the urine free from sugar or, at most, traces in fractional specimens. The diet was approximately 150 Gm. of carbohydrate, 70 Gm. of protein and 90 Gm. of fat (total calories 1,690), and the dosage of insulin was 44 units daily.

Cases of Diabetes Mellitus with Blood Sugars Over 1,000 Mg. Per Hundred Cubic Centimeters

Case	Authors	Reference	Age	Sex	Blood Sugar, Mg. %	Degree of Coma	Clinical Course	Comment
1	Pitfield	M. J. & Rec. **120**: 433, 1924	45	♂	1,700	Moderate	Died	
2	Paddock	J. A. M. A. **82**: 1855, 1924	22	♂	1,040	Moderate	Died	
3	Foster	J. A. M. A. **84**: 719, 1925	..	..	1,260	Complete	Recovered	Complicated by otitis media; CO_2 9 vol. %
4	Argy	Boston M. & S. J. **193**: 1236, 1925	33	♂	1,714	Complete	Died	
5	Joslin	Treatment of Diabetes Mellitus, 1928, p. 213	47	♂	1,490	Moderate	Died	Preinsulin era
6	Curtis and Dixson	J. A. M. A. **90**: 1115, 1928	18	♀	1,620	Complete	Recovered	CO_2 13 vol. %
7	Rabinowitch	Cited by Joslin, loc. cit., p. 193, and by Curtis and Dixson, loc. cit.	..	..	1,420	.....	Died	
8	Olmsted	Cited by Joslin, loc. cit. p. 213	14	..	1,400	Complete	Died	CO_2 27.7 vol. %
9	Shepardson and Anderson	Endocrinology **13**: 188, 1929	50	♂	1,090	Complete	Recovered	Cholesterol 705 mg. per 100 cc.
10	Haines and Davis	J. A. M. A. **99**: 24, 1932	58	♀	1,120	Complete	Recovered	
11	Haines and Davis	J. A. M. A. **99**: 24, 1932	30	♀	1,080	Complete	Recovered	CO_2 11 vol. %
12	Haines and Davis	J. A. M. A. **99**: 24, 1932	46	♀	1,296	Complete	Recovered	CO_2 18 vol. %
13	Lawrence	Brit. M. J. **1**: 377, 1934	..	♀	2,060	.....	Died	
14	Present case	.....	43	♀	1,500	None	Recovered	Complicated by hyperthyroidism; plasma cholesterol, 675 mg. per 100 cc.

COMMENT

The association of diabetes and hyperthyroidism is frequently encountered in large clinics, although as recently as 1931 Ginsberg [1] remarked that comparatively few cases have been reported in the literature. Fitz,[2] Allen,[3] Boothby and Wilder,[4] Wilder,[5] Joslin and Lahey [6] and John [7] have made pertinent contributions on the clinical aspects of this subject, and much evidence has been presented to show that hyperthyroidism adversely influences the course of diabetes. Pollack [8] and MacBryde [9] have recently reviewed the subject of insulin resistance and they consider hyperthyroidism to be the responsible factor in many cases of diabetes that are refractory to insulin. This is to be expected, since the advent of hyperthyroidism in a patient with diabetes, as exemplified by the present case, "creates abnormal demands upon an already inefficient carbohydrate metabolism both by virtue of an elevation of the basal metabolism and by enhancement of glycogenolysis." [10]

As indicated in the case report for the first few days following the thyroid resection the clinical condition of the patient was precarious and she continued to be markedly refractory to insulin. Several days later, however, the patient responded more favorably to insulin and the daily dose could be gradually reduced. A similar case exhibiting extreme postoperative resistance to insulin in a diabetic patient with hyperthyroidism was recently reported by Hills, Sharpe and Gay.[11]

In the majority of cases, hyperthyroidism precedes the onset of diabetes. John [7] has developed the Naunyn-von Noorden hypothesis to the extent that he believes that hyperthyroidism per se does not lead to a disturbance in carbohydrate metabolism; in patients with a predisposition to diabetes (diabetic "anlage"), however, the development of hyperthyroidism and the resultant demands of an increased metabolism brings about a true diabetes in the same manner as infection or obesity would in the same individual. The clinical observations of John and the experimental studies of Shpiner [12] lend proof to the validity of this hypothesis. The present case, however, does not belong to this category. This patient manifested all the signs and symptoms of true diabetes mellitus approximately three years before any evidence of hyperthyroidism developed. The advent of the thyrotoxic state so upset the already impaired carbohydrate metabolism that very large doses of insulin were required to bring the diabetic condition under control and to permit thyroidectomy.

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1. Ginsberg, A. M.: Hyperthyroidism and Diabetes Mellitus with a Report of Nine Cases, Endocrinology **15**: 225 (May-June) 1931.
2. Fitz, Reginald: The Relation of Hyperthyroidism to Diabetes Mellitus, Arch. Int. Med. **27**: 305 (March) 1921.
3. Allen, F. M.: Experimental Studies in Diabetes: Series II. The Internal Pancreatic Function in Relation to Body Mass and Metabolism: 10. Influence of Thyroid upon Diabetes, J. Metabolic Research **1**: 619 (May) 1922.
4. Boothby, W. M., and Wilder, R. M.: Metabolic Studies in Exophthalmic Goiter Complicated by Diabetes, J. Clin. Investigation **1**: 590 (Aug. 20) 1925.
5. Wilder, R. M.: Hyperthyroidism, Myxedema and Diabetes, Arch. Int. Med. **38**: 736 (Dec.) 1926.
6. Joslin, E. P., and Lahey, F. H.: Diabetes and Hyperthyroidism, Am. J. M. Sc. **176**: 1 (July) 1928.
7. John, H. J.: Hyperthyroidism Showing Carbohydrate Metabolism Disturbances: Ten Years' Study and Follow Up of Cases, J. A. M. A. **99**: 620 (Aug. 20) 1932.
8. Pollack, Herbert: Conditions Associated with Unusual Requirements for Insulin, Proc. Staff Meet., Mayo Clin. **8**: 453 (July 26) 1933.
9. MacBryde, C. M.: Insulin Resistance in Diabetes Mellitus, Arch. Int. Med. **52**: 932 (Dec.) 1933.
10. Andrus, E. C.: Hyperthyroidism and Diabetes Mellitus, Bull. Johns Hopkins Hosp. **50**: 383 (June) 1932.
11. Hills, R. G.; Sharpe, J. C., and Gay, L. N.: Diabetes Mellitus and Hyperthyroidism: The Report of a Case, Bull. Johns Hopkins Hosp. **55**: 193 (Sept.) 1934.
12. Shpiner, L. B.: Increased Metabolism Only One Factor in the Production and Maintenance of the Hyperglycemia and Glycosuria in Experimental Hyperthyroidism, Am. J. Physiol. **92**: 672 (April) 1930.

TREATMENT OF RHEUMATOID ARTHRITIS WITH FEVER INDUCED BY DIATHERMY

A FOLLOW-UP STUDY

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Since the preliminary report by Neymann and Osborne [1] in 1929 of the employment of high frequency currents in the production of fever, the therapeutic use of this method has been rapidly extended to various chronic diseases. At the same time, other methods such as the use of short radio waves and radiant and conducted heat have been employed, all successful in raising and sustaining a patient's temperature in a controlled manner. That chronic arthritis should have been one of the first diseases to be tried seems natural, since local heat to the joints, hot baths and fever induced by typhoid vaccine have long occupied a prominent place in its therapy. It is our purpose in this paper, after briefly reviewing the published reports of others who have utilized artificial fever, to summarize the end results in twenty-five cases of rheumatoid (atrophic) arthritis treated with fever produced by general diathermy. It is to be noted at this point that, in both our own cases and those cited from the literature, we have confined ourselves to rheumatoid or atrophic arthritis, sharply excluding both purely hypertrophic arthritis and that due to a specific organism, such as the gonococcus.

In 1932 Neymann and others,[2] using general diathermy, obtained definitely beneficial results in a total of 64 per cent of two groups, one of six patients followed for twenty months, and one of five followed for a year or less. They ascribed their success to the giving of eight weekly treatments with temperature sustained at 104 F. for at least ten hours and believed that briefer courses (two or three hours at 103 F. or less) were of no value. In the same year Tenney,[3] using short radio waves, reported fourteen out of sixteen patients with rheumatoid arthritis definitely helped. In his paper, no details of treatment or duration of follow up are included. Bierman [4] in 1933 stated that patients given a fever of 105 to 106 F. for several hours with the radiotherm, although showing marked temporary improvement, relapsed at least partially after a day or two. Further gain was seen, however, after successive treatments, and at the end of the series there was usually definite improvement. About the same time Berris [5] treated eleven cases of rheumatoid arthritis, the average course comprising eight treatments with temperatures of 102.5 F. for three and one-half hours. Only 28 per cent of these showed no gain, and he reports 36 per cent both objectively and subjectively improved and another 36 per cent only subjectively improved. King [6] also reported striking results in rheumatoid cases treated at 104 F. for two hours or more and stated that recurrences were caused by too long intervals between treatments. In two groups of patients, one of sixteen followed for about two years and another of twenty followed for about a year, Kohn and Warren [7] found that all but two derived definite benefit from one or more treatments with general diathermy. (The temperature maintained and the duration of treatments were not stated.) Three cases which relapsed later showed improvement with another treatment. In direct contrast to the startling results thus far recorded is the report of Nicholls and Stainsby [8] published early in 1934. These authors treated twelve patients from one to five times, with fever induced by radiant heat, with temperatures averaging from 104 to 105 F. for from three to five hours. At the end of a month or more, only three claimed subjective benefit, which was not substantiated by objective examination. The absence of noteworthy changes in the sedimentation rate of these patients following treatment confirmed the authors' clinical impression.

In table 1 are summarized our results obtained in twenty-five cases of rheumatoid arthritis. These had all been thoroughly studied in the medical wards before treatment was instituted and fulfilled the diagnostic criteria of rheumatoid arthritis. Most of them had received general treatment, including a high vitamin diet, rest, control of pain, physical therapy, and the removal of obvious foci of infection. During the follow-up period, such general treatment as seemed indicated was pursued. They were all given one or more treatments by means of a Victor superpower diathermy machine and the electrodes described by Neymann and Osborne.[9] During application of the high frequency current and after the electrodes had been removed, the patients were insulated with warm air by means of a box containing electric lamps,[10] and their temperatures were thus maintained. They were given fluids at room temperature as desired and were kept more comfortable by cold compresses on the head and the use of an electric fan. A mixture of opium and alkaloids in doses of one-third grain (0.02 Gm.) was used also. It is fair to state that the experience was a harrowing one for most of the patients and that treatments were not uncommonly followed by headache, nausea and vomiting, and severe herpes. Patient 9 expressed himself as "knocked out" by the treatment for three weeks. Undoubtedly some of this discomfort was due to the excessive sodium chloride loss in the sweat and could have been eliminated by the oral administration of sodium chloride in the course of the treatment, as advocated by Simpson.[11]

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The authors are indebted to Dr. Stafford Warren and his associates for suggesting the use of this method in cases of arthritis and have been privileged to draw freely on their experiences and to copy certain apparatus which they had devised.

1. Neymann, C. A., and Osborne, S. L.: Artificial Fever Produced by High Frequency Currents: Preliminary Report, Illinois M. J. **56:** 199-203 (Sept.) 1929.
2. Neymann, C. A.; Feinberg, S. M.; Markson, D. E., and Osborne, S. L.: Present Status of Electropyrexia, Arch. Phys. Therapy **13:** 749-768 (Dec.) 1932.
3. Tenney, C. F.: Artificial Fever Produced by Short Wave Radio and Its Therapeutic Application, Ann. Int. Med. **6:** 457-468 (Oct.) 1932.
4. Bierman, William, in discussion on Wolf, H. F.: Limitations of Physical Therapy in Arthritis, Arch. Phys. Therapy **14:** 205 (April) 1933.
5. Berris, J. M.: Treatment of Arthritis by Artificial Fever: Preliminary Report of Twenty Cases, J. Michigan M. Soc. **32:** 355-358 (June) 1933.
6. King, J. C.: Therapeutic Fever Produced by Diathermy: Its Present Developments and Future Possibilities, Radiology **20:** 449-456 (June) 1933.
7. Kohn, L. A., and Warren, S. L.: Preliminary Report on Treatment of Chronic and Subacute Infectious Arthritis by Artificial Fever, J. Clin. Investigation **12:** 971 (Sept.) 1933.
8. Nicholls, Edith E.; Hanson, K. G., and Stainsby, W. J.: Treatment of Rheumatoid Arthritis with Hyperthermia Produced by High Frequency Current, J. Bone & Joint Surg. **16:** 69-74 (Jan.) 1934.
9. Neymann, C. A., and Osborne, S. L.: The Treatment of Dementia Paralytica with Hyperpyrexia Produced by Diathermy, J. A. M. A. **96:** 7 (Jan. 3) 1931.
10. Bishop, F. W.; Horton, C. B., and Warren, S. L.: A Clinical Study of Artificial Hyperthermia Induced by High Frequency Currents, Am. J. M. Sc. **184:** 515-533 (Oct.) 1932.
11. Simpson, W. M.; Kislig, F. K., and Sittler, E. C.: Ultra-High Frequency Pyretotherapy of Neurosyphilis, Ann. Int. Med. **7:** 64-75 (July) 1933.

The age of the patients treated varied from 16 to 58 years, with an average of 36. There were nine males and sixteen females in the series. The average duration of the disease was three and one-half years, with extremes of three months and seventeen years. We took the cases as they came along, so that the series includes both early, mild cases and advanced, severe, crippling types. In table 1 we have attempted to summarize the degree of arthritis before the treatment, with cartilage involvement demonstrated by definite joint narrowing in roentgenograms. It can be seen that all presented soft tissue changes, and nineteen, or 76 per cent, a certain amount of cartilage destruction. In the next column is shown the vascular status of the patient, so important in this disease. Fifteen, or 60 per cent, had vasomotor disturbances, as evidenced by cold extremities, increased sweating and cyanosis, while 24 per cent had arteriosclerosis, demonstrated either clinically or by roentgenograms. In all, seventy-one treatments were given our group of twenty-five patients, with the temperature usually maintained at 104 F. or over for four hours. Patients 2, 3 and 22 were given briefer treatments lasting from two to three hours, at lower temperatures (from 102 to 103 F.).

TABLE 1.—*Clinical Course in Twenty-Five Cases*

Patient	Age, Sex	Duration of Disease	Involvement		Limitation	Vascular Changes	Treatments	Duration of Improvement	Follow Up	Final Result	Comment
			Soft Tissue	Cartilage							
1	34, ♀	6 yrs.	Slight	None	None	Vasomotor	One of 4 hrs. at 105 F.	None	33 mos.	Unchanged	Mild subcutaneous burn
2	27, ♂	5 mos.	Moderate	None	Slight	Vasomotor (marked)	Three of 4 hrs. at 104-105 F.; ten of 2-3 hrs. at 103 F.	16 mos.	16 mos.	Improved	Still shows definite arthritic changes and unable to work
3	31, ♂	4 yrs.	Marked	Moderate	Moderate	Vasomotor (marked) arteriosclerosis	Three of 4 hrs. at 106 F.; twelve of 2-3 hrs. at 103 F.	6 mos.	14 mos.	Worse	Not helped by typhoid vaccine intravenously
4	57, ♀	1.5 yrs.	Moderate	Moderate	Moderate	Arteriosclerosis	One of 4 hrs. at 104 F.	1 mo.	38 mos.	Worse	Severe second degree burn
5	26, ♀	2 yrs.	Slight	None	None	Vasomotor	Two of 4 hrs. at 105 F.	28 mos.	33 mos.	Well	Became pregnant one month after last treatment
6	23, ♀	2 yrs.	Moderate	Slight	Slight	Vasomotor (marked)	Two of 4 hrs. at 105 F.	32 mos.	32 mos.	Improved	Remission began two months before treatments
7	21, ♀	3 mos.	Slight	Slight	Slight	Vasomotor	One of 4 hrs. at 106 F.	2 wks.	39 mos.	Unchanged	Initial improvement followed by exacerbation of two months, including knee effusion; then nearly well for over two years followed by another exacerbation
8	42, ♀	6 yrs.	Moderate	Moderate	Moderate	Vasomotor	Two of 4 hrs. at 105 F.	None	30 mos.	Worse	Marked headaches and buccal herpes following treatment
9	21, ♂	6 yrs.	Marked	Marked	Marked	None	One of 4½ hrs. at 103 F.	None	36 mos.	Unchanged	"Knocked out" for three weeks following treatment
10	32, ♀	2 yrs.	Moderate	Moderate	Moderate	Vasomotor arteriosclerosis	Two of 4 hrs. at 104 F.	3 wks.	6 mos.	Worse	
11	36, ♂	5 yrs.	Moderate	Moderate	Moderate	None	One of 4 hrs. at 103 F.	1 mo.	19 mos.	Worse	
12	16, ♀	7 mos.	Slight	None	None	Vasomotor	One of 4 hrs. at 105 F.	9 mos.	25 mos.	Unchanged	Exacerbation of eight months followed initial improvement
13	38, ♀	6 mos.	Moderate	None	Moderate	None	One of 4 hrs. at 104 F.	18 mos.	18 mos.	Nearly well	Unusually faithful local and general treatment followed
14	25, ♀	4 yrs.	Marked	Marked	Marked	Vasomotor (marked)	One of 4 hrs. at 104 F.	None	34 mos.	Worse	
15	46, ♂	6.5 yrs.	Slight	Moderate	Moderate	None	One of 4 hrs. at 103 F.	None	37 mos.	Unchanged	
16	23, ♀	5 yrs.	Moderate	Moderate	Marked	None	One of 4 hrs. at 105 F.	3 days	38 mos.	Worse	
17	42, ♀	1.5 yrs.	Moderate	Moderate	Marked	Vasomotor (marked) arteriosclerosis	Three of 4 hrs. at 104-105 F.	1 week	33 mos.	Worse	Improved for six months after first two treatments; ensuing relapse not affected by third treatment
18	36, ♀	4.5 yrs.	Moderate	Moderate	Moderate	Arteriosclerosis	One of 4 hrs. at 106 F.	6 mos.	36 mos.	Worse	
19	55, ♂	3 yrs.	Slight	Moderate	Slight	Arteriosclerosis	One of 4 hrs. at 105 F.	3 days	25 mos.	Worse	
20	47, ♂	4 yrs.	Moderate	Moderate	Marked	None	Two of 4 hrs. at 105 F.	3 days	29 mos.	Worse	
21	58, ♂	17 yrs.	Moderate	Marked	Marked	None	Ten of 4 hrs. at 105 F.	1 week	38 mos.	Unchanged	Unchanged for 14 months, improved for 18 months, back to former status in last 6 months
22	31, ♂	2 yrs.	Moderate	Moderate	Slight	Vasomotor (marked)	Four of 2-3 hrs. at 104 F.	2 wks.	28 mos.	Worse	
23	41, ♀	1.5 yrs.	Moderate	Moderate	Moderate	Vasomotor	Two of 4 hrs. at 104 F.	27 mos.	41 mos.	Improved	Complicated by ulcerative colitis
24	34, ♀	8 mos.	Slight	None	None	Vasomotor	One of 4 hrs. at 105 F.	2 wks.	40 mos.	Unchanged	
25	42, ♀	5 yrs.	Moderate	Moderate	Moderate	Vasomotor	One of 4 hrs. at 105 F.	1 mo.	30 mos.	Worse	

RESULTS

In twenty out of our twenty-five cases, at least temporary improvement was shown, both subjectively, in freedom from pain, and objectively, in increased joint motion and occasionally in decreased effusion and

swelling. At times the results were almost miraculous and encouraged greatly both the patients and ourselves. Unfortunately, with few exceptions this improvement was only temporary, and in only five, or 20 per cent, has the gain been maintained to the end of the follow-up period. Table 2 shows roughly the duration of improvement after the course of treatments.

It can be seen from table 1 that patient 21, in the course of over three years' follow up, was unchanged for fourteen months and improved for the next eighteen months, only to return to his former status during the last six months. This illustrates the variable course of the disease and the danger in drawing conclusions after a comparatively brief follow up. Patient 17 was benefited for six months after her first two treatments and then relapsed. She was treated again, with benefit lasting only a week, and has since steadily gone down hill.

An attempt has been made to follow this group of twenty-five patients as carefully as possible after their diathermy treatments. As seen by table 1, nine have been followed for three years or more, nine for two years or more, and all but one of the remainder for over a year. The final survey shows that five, or 20 per cent, were improved; seven, or 28 per cent, were essentially unchanged, while thirteen, or 52 per cent, were worse. Considering the severity of the treatments,

TABLE 2.—*Duration of Improvement*

Duration	Cases
None	5
Up to 2 weeks	8
From 2 weeks to 6 months	6
From 6 months to 1 year	1
From 1 year to 2 years	2
Two years or more	3

these results seem hardly to justify the continued use of this form of therapy.

Of the five patients who improved, one (patient 5) became pregnant within a month after her last treatment and has continued to be free from the disease since. It is well known that pregnancy will frequently induce a remission in rheumatoid arthritis. Patient 6 had apparently started on a remission two months before the treatments were given, although they undoubtedly accelerated her improvement. Patient 13 pursued a course of rest and physical therapy of unusual faithfulness at home following the fever treatments. Thus, in three of our five patients who improved it is not possible to ascribe honestly the gain to diathermy. We have not mentioned these facts in an attempt to deprive fever therapy of any value whatever and realize fully that, in the patients who were unchanged or became worse, deleterious factors may well have been at work. But we do wish to reemphasize the difficulty of evaluating properly any form of therapy in rheumatoid arthritis, that its course is variable and subject to remissions and relapses (the reasons for which can often not be traced) and, finally, that it is exceedingly dangerous to single out any temporary improvement as a cure. Furthermore, we agree with others that the mental attitude of the patient is of the utmost importance in many cases in determining the outcome. Such a radical form of therapy as general diathermy cannot help but impress and encourage the patient, especially if there is a marked immediate gain. This is well illustrated in patient 13, who arrived in the hospital discouraged and with little will to improve. Her formulation of the decision to undergo this new and radical treatment, as well as carrying through the ordeal itself, undoubtedly pointed the way to a successful course of therapy, largely carried on by her husband and herself at home.

Several patients were given a succession of treatments. Patient 2, a man aged 27, with rheumatoid arthritis of five months' duration, showing definite soft tissue changes but no evidence of cartilage destruction and marked vasomotor instability, first had infected tonsils and teeth removed. He was then given two fever treatments of four hours at 105 F., with definite benefit. He was sent home and became worse in the course of a month, with effusions in both knees and limitation of one elbow. He was then given ten biweekly brief treatments of from 103 to 104 F., lasting about three hours, with subjective and objective improvement. When the patient was seen a year later, this improvement had been maintained, but he still showed definite arthritic changes and was unable to work. Another (patient 3) was a man, aged 31, with a severe, crippling type of rheumatoid arthritis of four years' duration, following trauma, with progressive periarticular swelling and effusion, involving multiple joints, with increasing ankylosis. He also showed marked weight loss, muscular wasting and psoriasis. Synovectomy gave typical pathologic findings of rheumatoid arthritis. He was given three treatments at 106 F. for four hours. He then gained 9 pounds (4 Kg.), with the aid of insulin. Next he was given twelve biweekly briefer treatments at 103 F., lasting about three hours. These were followed by two transfusions. At the end of this time his general condition was excellent, but his arthritis was slowly progressing, and when seen ten months later he was much worse. A third patient (21) was a man, aged 58, in his third attack of rheumatoid arthritis of fifteen months' duration, over a period of seventeen years. During this period he had three nearly complete remissions, lasting respectively six, two and a half and five years. He showed marked limitation with little active inflammation. General treatment was of some benefit. This was followed by one treatment at 104 F. for four hours, with marked relief for two days, followed by a relapse, with swelling of his ankles and feet. Next he was given nine treatments at 105 F. for four hours at weekly intervals, with relief from pain each time lasting up to about the time of his next treatment, but little permanent gain at the end of the series. He stood the treatments well, except that vomiting followed, not helped by rectal dextrose. He was seen frequently during the next fourteen months and, after following a fluctuating course, was about the same as before the fever therapy. He then showed definite gain in the course of a year without further diathermy treatments, as a result, he believed, of the extraction of infected teeth, but in the last six months he has had another relapse. We have mentioned these cases in order to show that even repeated treatments may not give permanent improvement.

What of the five who improved? Is there any way of foretelling which patients might benefit from this treatment? Briefly, they were younger than the others (three were under 30), their arthritis was of shorter duration, they showed in general little or no cartilage destruction or limitation, and, finally, all but two demonstrated more marked vasomotor changes. Furthermore, in the course of the treatment the increase in pulse pressure, which we believe to be an index of vaso-

dilatation, was more marked than in the group that did not improve. We consider therefore that, in common with other measures which help rheumatoid arthritis, such as the use of typhoid vaccine intravenously, physical therapy and possibly salicylates and ammonium orthoiodoxyl benzoate, fever therapy acts by increasing the blood supply of the affected tissue. Berris [5] and King [6] agree that the increased peripheral circulation is the important therapeutic factor, while Nicholls and her associates [8] ascribe the temporary decrease in joint swelling to dehydration of the body.

From the results that we have obtained with our twenty-five cases treated with artificial fever, we are forced to conclude that this method is of only temporary benefit. It is possible, of course, that patients given fever for ten hours or more, as advised by Neymann and Osborne,[2] will fare better, although the increased duration would tend to multiply the dangers and discomforts. We hope that these authors will extend such observations to a larger series of patients. Again, as suggested by our figures, a selected group of young patients, with slight involvement and arthritis of brief duration, might respond successfully. If so, the results could be interpreted with difficulty, since it is just this group that general therapy usually aids.

We have stated before that our series of cases is limited to rheumatoid arthritis, with hypertrophic and gonorrheal arthritis carefully excluded. We have had some experience in the treatment of the latter disease with artificial fever produced by general diathermy or radiant heat. In general, our results have been excellent and far superior to those obtained in rheumatoid arthritis, both in immediate relief of pain and inflammation and in leaving the patient with useful joints. We have seen, however, equally favorable end results in patients treated with fever induced by typhoid vaccine intravenously.

SUMMARY AND CONCLUSIONS

1. Twenty-five patients with rheumatoid arthritis were given seventy-one artificial fever treatments by means of general diathermy.

2. The number of treatments given each patient varied from one to fifteen, and the usual temperature maintained was 104 F. for four hours.

3. While no patient was seriously injured by this treatment, all looked on it as a harrowing ordeal.

4. Eighty per cent of our cases showed temporary improvement, but in only 20 per cent was this maintained until the end of the follow-up period.

5. When we balance the results obtained against the severity of the treatment, our conclusion is that in rheumatoid arthritis the use of this method is only occasionally justified and should not be used to the exclusion of general treatment.

Photosynthesis.—In green leaves the energy of sunshine supports a chemical reaction or reactions (photosynthesis) in which organic compounds such as sugars and starches are synthesized from the simple inorganic substances carbon dioxide (carbonic acid) and water, and the energy of a part of the light is, so to speak, locked up in the foodstuffs thus formed—sugars and starches; more indirectly, fats; and still more indirectly, the other organic compounds of our foods. Even in the formation of the sugars and starches, photosynthesis is probably a rather complicated and indirect process as it occurs in nature; so that laboratory syntheses of sugars probably do not actually duplicate the natural process, nor really forecast an era of synthetic food.—Sherman, H. C.: Food and Health, New York, Macmillan Company, 1934.

THIOGLYCEROL

A MORE STABLE SULPHYDRYL COMPOUND FOR USE IN THE HEALING OF WOUNDS

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Reimann [1] in May 1930 reported relatively rapid healing of cutaneous ulcers by means of thiocresol. Later work by Reimann and others seems to confirm his observations. This paper offers observations based on animal experiments and 264 clinical cases treated with Thioglycerol. Thioglycerol seems to have certain advantages over other sulphydryl compounds that have been suggested for the stimulation of wound healing.

Hammett and Reimann,[2] as a result of well controlled experiments on plants, rats and mice and finally on man, concluded that sulphur in the form of the chemical group sulphydryl (SH^-) is an essential to cell production. Reimann [3] also showed that animal skin could be thickened and the thickness of human skin grafts increased by the application of thiocresol, 0.25 per cent in hydrous wool fat. Birnbaum [4] reported favorable results from the use of thiocresol on a variety of denuded surfaces and on skin grafts. Brunsting and Simonsen [5] confirmed the observations of Reimann and Hammett concerning the stimulating properties of certain sulphydryl-containing compounds. They found that cysteine, in water solution, stimulated granulation tissue and epithelium and seemed to inhibit bacterial growth. Their conclusions were based on more than 200 cases at the Mayo Clinic.

All sulphydryl compounds so far suggested for the stimulation of wound healing have the disadvantage of being very unstable. Their solution must be freshly made and dressings changed frequently. Granulations grow more rapidly than epithelium and must be reduced before epithelium can advance. Search was therefore made for a more stable sulphydryl compound and a simple method of controlling the growth of granulation tissue.

THIOGLYCEROL

Thioglycerol ($CH_2OHCHOHCH_2SH$) was produced by Gelormini [6] in June 1931 by treating glycerol alpha chlorhydrine with potassium hydrosulphide under pressure and in alcoholic solution. Thioglycerol deteriorates less than 10 per cent a month at room temperature but liberates sulphydryl more rapidly at body temperature. It has a hydrogen sulphide odor and physical properties similar to those of glycerin.

CLINICAL RESULTS

Since June 1931, Thioglycerol has been used in 264 clinical cases (shown in the accompanying table), including a variety of wounds and ulcers. Photographs

Aided by a grant from the Hendricks Fund for Medical Research.
From the Department of Surgery, Syracuse University College of Medicine.

1. Reimann, S. P.: Use and Reasons for Use of Thiocresol to Stimulate Wound Healing, J. A. M. A. **94:** 1369 (May 3) 1930.
2. Reimann, S. P.: Proliferation of Rat and Mouse Epithelium from Sulphydryl, Protoplasma **10:** 82 (June) 1930. Hammett, F. S., and Reimann, S. P.: Cell Proliferation Response to Sulphydryl: In Mammals, J. Exper. Med. **50:** 445 (Oct.) 1929; In Man, Proc. Soc. Exper. Biol. & Med. **27:** 20 (Oct.) 1929. Hammett, F. S.: The Chemical Stimulus Essential of Growth by Increase in Cell Number, Protoplasma **7:** 297 (April) 1929; The Proliferative Reaction of the Skin to Sulphydryl and Its Biological Significance, ibid. **13:** 331 (Aug.) 1931.
3. Reimann, S. P.: Thiocresol in Wound Healing, Ann. Surg. **93:** 624 (Feb.) 1931.
4. Birnbaum, I. R.: Thiocresol in Wound Healing and Skin Grafting, Ann. Surg. **96:** 467 (Sept.) 1932.
5. Brunsting, L. A., and Simonsen, Daisy G.: Cutaneous Ulcers Treated by the Sulphydryl Containing Amino Acid Cysteine, J. A. M. A. **101:** 1937 (Dec. 16) 1933.
6. Gelormini, O., and Barrus, A. W., from the Department of Chemistry, Syracuse University, unpublished data.

were taken in some cases; in others measurements were made at intervals during the healing process. Only a few with control wounds were available. A 1:5,000 solution of Thioglycerol in glycerin was used in most instances, but the percentage of glycerin was varied

Fig. 1 (case 3).—Burn of the axilla after three weeks' treatment with Thioglycerol.

according to the age of the wound and the condition of the granulating surface. Most of the ambulatory cases were treated with Thioglycerol in mucilage of tragacanth. This combination was also used on recent burns and other sensitive surfaces. Hydrous wool fat (lanolin) containing 0.25 per cent of Thioglycerol was used to thicken the epithelium of recently healed ulcers and large, thin (Ollier-Thiersch) grafts, as suggested by Reimann.[3]

Healing in Two Hundred and Sixty-Four Clinical Cases Treated with Thioglycerol

		Old Lesions		Recent Lesions		Preliminary Treatment		Sensitive		Satisfactory		Unsatisfactory	
		Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
Bed patients	123	83	68	40	32	75	61	3	2.5	113	92	10	8
Ambulatory patients....	141	107	76	34	24	96	68	2	1.4	121	86	20	14
Total cases	264	190	72	74	28	171	65	5	1.9	234	89	30	11

In tabulating the results of treatment of the clinical cases, healing was considered satisfactory when failure to heal under ordinary treatment was followed by relatively rapid healing under treatment with Thioglycerol. Sixty-five per cent of the cases required some preliminary treatment such as improvement of drainage or removal of necrotic tissue. Evidence of irritation or sensitivity was present in five cases, or 1.9 per cent. Healing was unsatisfactory in thirty of the 264 cases. Of these, twenty were ambulatory and ten were bed patients. Lack of cooperation was evident in eight of the ambulatory cases. Two bed patients had large, unhealed burns of months' duration. Both of them seemed to be sensitive to sulphydryl, and treatment was discontinued. In the remaining twenty unsatisfactory cases, healing ceased or progressed very slowly as the wound area became small. In the satisfactory cases, gross evidence of epithelial advance was evident within forty-eight hours and was continued unless interrupted by unfavorable conditions. In general, the rate of healing seemed to be proportional to the area of the wound, as shown by Carrel and Hartmann.[7]

Thioglycerol in glycerin or water-soluble jelly has been used to stimulate the healing of extensive, deep burns having islands of epithelium, after the necrotic tissue has separated. The following case is an example:

CASE 1.—A woman, aged 28, was severely burned in a fire, March 6, 1932. The face and hands received second degree burns. The lower extremities, from the hips to the soles of the feet, were completely involved, more than 70 per cent of the total area being third degree burns. A tannic acid crust was produced on the legs. The crusts were removed because of purulent accumulations beneath them, and sodium hypochlorite (Dakin's) solution was applied to remove remnants of crust. March 18 there was very little healing of the third degree areas. Thioglycerol (1:5,000) in glycerin was then applied on six layers of gauze and covered with waxed paper. Dressings were changed daily. Every third or fourth day, adhesive strapping was substituted for the Thioglycerol. Healing was complete on April 11, and the patient went to a dance ten days later. Examination nine months later showed the scars to be soft and movable. Her sister, two years older, was burned in the same fire. The burns showed almost the same distribution and depth except that there were fewer islands of epithelium. Her legs were grafted on two occasions, large thin grafts being used. Eighty-five per cent of the surfaces were thus covered. Thioglycerol was not used on this patient

Fig. 2 (case 3).—One year after complete healing.

Healing between the grafts was very slow and not complete until May 22. Nine months after healing of the grafts she still complained of swelling and aching of the legs.

Included in this series were several electrical burns and a number of chemical burns. Case 2 is one of electrical burns.

7. Carrel, Alexis, and Hartmann, Alice: Cicatrization of Wounds, J. Exper. Med. **24**: 429 (Nov.) 1916.

CASE 2.—A boy, aged 9 years, received electrical contact burns on the backs of both feet, May 30, 1931. He was admitted to the University Hospital three weeks later because the wounds had not begun to heal. They were free of necrotic tissue, but the extensor tendons were exposed on one foot, while the fifth metacarpal bone and a proximal phalanx of the other foot were partly exposed. Thioglycerol (1:5,000) in pure glycerin was used on one foot and pure glycerin on the other, the dressings being changed once a day. The wound treated with Thioglycerol showed activity at forty-eight hours and was about 40 per cent healed in twelve days. The control wound remained clean and there was a slight advance of epithelium. The treatment was then reversed. Within ten days healing was about even in the two wounds.

Fig. 3 (case 4).—Burn of the leg. Result of fifteen days' treatment with Thioglycerol.

The frequency with which deep burns involving the arm, chest and axilla result in loss of function through scar contracture is well known. Such a case, in which healing occurred without loss of function, is illustrated in case 3 (figs. 1 and 2).

CASE 3.—A girl, aged 8 years, was burned by fire, Nov. 1, 1931. She was sent to the hospital November 21 because the wound was not healing. There was a deep burn of the proximal half of the arm, anterior fold of the axilla, and a small part of the chest wall. The Carrel-Dakin technic was used for ten days until necrotic tissue had separated. Thioglycerol was then applied as in the previous cases. Three weeks later (fig. 1) the area was 90 per cent healed. At five weeks, healing was complete and the arm could be thrust upward without limitation. Examination one year later (fig. 2) showed a soft scar without tension.

CASE 4.—A girl, aged 7 years, caught her leg between a hot radiator and the wall, Nov. 19, 1931. When the leg was extricated, an extensive third degree burn of the calf, involving almost the entire circumference of the leg, was found. Figure 3 shows the degree of healing after fifteen days' treatment with Thioglycerol (1:5,000) in 70 per cent glycerin. The Carrel-Dakin technic was used for six days to remove necrotic tissue before Thioglycerol treatment was started. The area was entirely covered with epithelium, December 28, thirty-nine days after the injury.

ANIMAL EXPERIMENTS

Technic.—Male white rats weighing about 100 Gm. were used. The rats were anesthetized with ether. The abdominal skin was shaved and scrubbed with soap solution and ether. A circular piece of abdominal skin, about 2 cm. in diameter, was excised from each side of the abdomen with scissors. Each wound was covered with four layers of sterile gauze. Rubber dam was placed over the gauze, fixed to the skin between the wounds with rubber cement and continued around to the back, where it was fastened by lacings. Solutions to be tested were introduced through holes in the rubber. Glycerin solutions were introduced but once in twenty-four hours, other solutions every two hours. Every fourth day the rats were anesthetized, the dressings opened and the wound areas recorded by means of a camera lucida and a planimeter.

Thiocresol.—Two experiments were carried out, twelve and sixteen white rats being used. One wound was treated with thiocresol 1:10,000 in water solution while physiologic solution of sodium chloride was applied to the control wound. Granulations were not reduced.

1. The wounds treated with thiocresol healed 18 per cent faster than the control wounds.

2. Slight superficial necrosis of the granulations was seen in the wounds treated with thiocresol.

Glycerin.—Clinical experience with the use of glycerin on granulating wounds suggested that, because of its dehydrating action, glycerin might retard the exuberant growth of granulation tissue. To determine the effect of glycerin on granulating tissue, six white rats were used. One was treated with pure glycerin and the other with saline solution.

Granulations grew rapidly in the wounds treated with saline solution. In those treated with glycerin the granulations remained relatively level. Necrosis was absent from both wounds. Glycerin was therefore selected as the vehicle for Thioglycerol experiments.

Thioglycerol.—Three series of rat experiments, with ten, twelve and sixteen rats, were carried out. Thioglycerol was used in pure glycerin and the controls were treated with pure glycerin only. The purpose of the first series was to determine the optimal dilution of Thioglycerol. A dilution of 1:5,000 seemed to give the best results. This dilution was therefore used in the second and third series.

1. A dilution of 1:5,000 seemed optimal.

2. The wounds treated with 1:5,000 Thioglycerol in glycerin healed 21 per cent faster than those treated with glycerin alone.

CLINICAL RESULTS WITH THIOCRESOL

The clinical use of parathiocresol, as suggested by Reimann,[1] was begun in June 1930. Thirty-two patients having sluggish granulating wounds were selected. These wounds were treated with 1:10,000 water solution of thiocresol. The following observations were made: 1. In every case epithelium advanced until unfavorable granulations were reached. 2. Granulations developed so rapidly that the advance of epithelium was checked. 3. After forty-eight hours' treatment, slight superficial necrosis of the granulating surface was evident in twenty-six of the thirty-two wounds. 4. Because of the instability of thiocresol, water solutions must be freshly made and the dressings moistened frequently.

CLINICAL USE OF THIOGLYCEROL

For the treatment of ambulatory patients, Thioglycerol (1:5,000) in mucilage of tragacanth is used. A layer of the tragacanth mixture, one-fourth inch in thickness, is applied directly to the wound on four layers of gauze, covered with some impervious material, such as cellophane or rubber, and bandaged in place. This dressing is changed once in twenty-four hours.

If the patient is not ambulatory, Thioglycerol (1:5,000) is used in pure glycerin, 70 per cent glycerin

or water solution, depending on the character of the granulating surface. When the granulations are level with the epithelial edge, 70 per cent glycerin is the solvent used. If they are redundant or pale, pure glycerin is used. But if they are below the skin level, a water solution of Thioglycerol (1:5,000) is injected every two hours through tubes fixed in the dressing. When glycerin is used, six layers of gauze are saturated with the solution and covered with impervious material. These dressings are changed once in twenty-four hours.

In both the ambulatory and the bed cases, best results will be obtained by the intermittent treatment as suggested by Reimann.[1] This may be done by changing to adhesive strapping, glycerin or saline solution for twenty-four hours every two or three days.

Wounds should be laid wide open so that healing may progress from the bottom. No satisfactory solvent of necrotic tissue has been found for use in the ambulatory cases. In hospital cases the Carrel-Dakin technic is used until necrotic tissue is removed. High granulations may be shaved down with a razor blade if they are not too sensitive, or silver nitrate may be applied and followed by pepsin-hydrochloric acid solution, as advised by Reimann.[1]

The part should be kept warm, protected from trauma and immobilized if possible. Elevation, elastic pressure or strapping may be indicated to improve circulation. Systemic conditions that may interfere with healing should not be neglected. Large defects will require skin grafting. Very old ulcers with poor local circulation will heal more rapidly after excision. Overhanging edges that have become covered with epithelium may be excised. Granulations must be relatively level, free from necrotic tissue, red and firm.

CONTRAINDICATIONS

Sulphydryl compounds should not be used if a malignant condition is suspected. Treatment should be discontinued if signs of skin irritation appear. Prolonged application of sulphydryl compounds to skin grafts may cause excessive thickening of the grafts and contracture of the grafted area.

COMMENT

There are many factors in the healing process, which vary not only in different individuals but in the same individual at different times. Careful observation of the healing wound will often lead to a change in treatment. Correction of conditions that retard repair should take precedence over the use of measures to stimulate healing.

Thioglycerol has been used for several months at the Mayo Clinic [8] with satisfactory results.

Sensitivity to sulphydryl was observed in only five of 264 cases. Reimann [9] observed sensitivity in eighteen of 450 cases in which he painted the skin of the arm with 1 per cent alcoholic solution of thiocresol.

Thioglycerol seems to offer the following advantages over other sulphydryl compounds in the stimulation of wound repair:

1. In its original state or dissolved in pure glycerin, Thioglycerol retains its clinical activity for more than six months when kept at room temperature.

2. Dissolved in glycerin or in a water-soluble base, it need be applied but once a day. It is therefore available for ambulatory patients.

3. The use of glycerin as a vehicle seems to hold granulations in check and allow the epithelium to advance.

CONCLUSIONS

1. The work of Reimann on the stimulation of wound healing by sulphydryl is confirmed.

2. Thioglycerol is a relatively stable sulphydryl compound that can be used for the stimulation of wound repair in ambulatory as well as in hospital cases.

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8. Osterberg, A. E.: Personal communication to the author, Aug. 17, 1934.

9. Reimann, S. P.: "Sensitivity" to Sulphydryl, Am. J. Clin. Path. **3**: 111 (March) 1933.

Clinical Notes, Suggestions and New Instruments

OBSTRUCTION OF A CORONARY ARTERY DUE TO THE PRESSURE FROM A CALCIFIED NODULE IN THE MYOCARDIUM

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Coronary occlusion due to disease of the coronary arteries has been extensively studied and described. Calcified nodules [1] in the myocardium have also been investigated, even by the less recent pathologists. Mönckeberg [2] mentions disturbances of conduction due to such nodules by pressure on or by involvement of a branch of the conduction system. Hochrein [3] points out that calcified stenotic mitral valves, by distorting the sinuses of Valsalva, may more or less interfere with the coronary circulation. A fairly extensive search of the literature fails to reveal a record of an obstruction of a healthy coronary artery due to pressure from a source outside the vascular wall. This seemed justification for recording the following case:

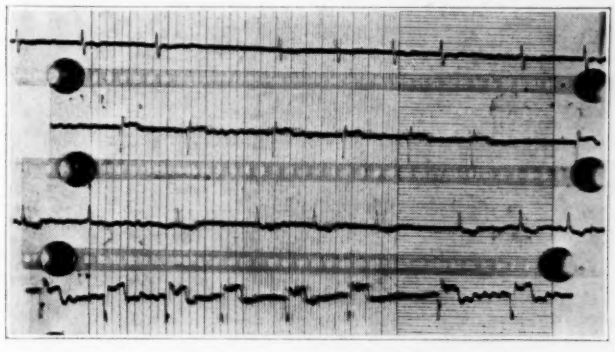


Fig. 1.—Electrocardiogram of May 17, 1933, showing a marked elevation of the ST segment in the chest lead IV, indicating a coronary occlusion. Auricular fibrillation is also present.

H. T. M., a man, aged 42, admitted to the Lutheran Hospital, May 12, 1933, in the service of Dr. H. A. Wigton, was having delusions of persecution and was restrained with considerable difficulty. His temperature was 100.6 F. Because there was evidence of disturbed cardiac function, the psychosis was regarded as due to a toxemia. For this reason he was referred for a cardiac examination.

May 14 he had a complete hemiplegia, apparently due to a cerebral embolism. The pulse was completely irregular. The rate varied from 50 to 130 per minute.

Examination showed right hemiplegia. The patient was unable to speak distinctly. He apparently was conscious of

1. Benda, C.; Jones, L.; Mönckeberg, J. G.; Ribbert, H., and Winkler, K.: Herz und Gefässe, in Henke, Friedrich, and Lubarsch, Otto: Handbuch der speziellen pathologischen Anatomie und Histologie, Berlin, Julius Springer **2**: 406, 1924.

2. Mönckeberg, J. G.: Zur Einteilung und Anatomie des Adams-Stokes'schen Symptomkomplexes, Beitr. z. path. Anat. u. z. allg. Path. **63**: 1, 1917.

3. Hochrein, Max: Der Coronarkreislauf Physiologie, Pathologie, Therapie, Berlin, Julius Springer, 1932.

his surroundings. The respirations were rapid, varying from 30 to 40 per minute. The lungs showed a dulness at both bases, together with consonating râles. There was a moderate number of coarse râles throughout the chest. The heart was enlarged. The apex was 1 inch outside the midclavicular line. There was considerable enlargement to the left in the third and fourth interspaces. A soft systolic murmur was heard at the mitral area. The first sound at the mitral area was absent. The second pulmonic sound was extremely accentuated and was also very definitely palpable.

Fig. 2.—Teleoroentgenogram of May 17, 1933, showing an enlarged right auricle and pulmonary conus. The pulmonary artery is very prominent. The left auricle is also moderately enlarged.

May 23 there was an increased enlargement of the heart to the left. The systolic murmur at the mitral area was louder and longer, together with a definite diastolic rumble at the apex. The electrocardiogram on this date showed a slow fibrillation. The fourth lead (chest) showed a marked elevation of the ST interval (fig. 1).

A diagnosis of mitral stenosis, coronary occlusion and pulmonary infarcts was made.

The temperature was elevated from May 12 to May 27, averaging about 100.5 F. For two days, May 24 and 25, it reached 103.6 F. The pulse remained completely irregular. After complete digitalization, the heart rate decreased. The first sound at the mitral area recurred and became accentuated. Following this the fever gradually subsided.

June 7, when he left the hospital, there were no râles in the chest and the temperature was normal. The paralysis had improved so that he had almost complete use of his leg and about 50 per cent use of his arm. Facial paralysis was also much improved.

Fig. 3.—Mitral valve, showing a markedly thickened and calcified posterior cusp and a fibrotic anterior cusp forming a semilunar slit between the free margin.

June 11 he had a short recurrence of acute pulmonary edema and rapid fibrillation. This attack completely subsided in five days. Then for several weeks he was quite comfortable in bed and sat up in a chair several times.

June 24 he had a recurrence of the acute respiratory distress. This gradually increased in intensity with extremely rapid respirations and rapid fibrillation. He died, June 30.

Results of the laboratory examination were as follows:

The urine showed: specific gravity, 1.026, with acid reaction; albumin, trace, and sugar, negative. Microscopic examination of a specimen yielded a few white blood cells, and a few red blood cells.

Blood pressure readings were as follows: May 14, 1933, 80/60; May 18, 100/80; May 22, 100/60, and May 30, 90/50.

The blood count, May 13, was: hemoglobin, 94 per cent; red blood cells, 5,200,000; white blood cells, 14,200: polymorphonuclear leukocytes, 78 per cent; lymphocytes, 21 per cent; eosinophils, 1 per cent.

Cultures of the blood were negative. The blood Wassermann reaction was negative.

A teleoroentgenogram (fig. 2) showed an enlargement of the right auricle and marked prominence of the pulmonary artery and the pulmonary conus. The left ventricle was also enlarged. The general contour was that of a mitral stenosis and an enlarged left auricle.

At autopsy the heart was markedly enlarged, especially the right side and the left auricle. Almost the entire anterior surface of the heart lay against the chest wall. The pericardium showed a large white superficial plaque, measuring about 2 by 3 cm. on the anterior surface of the right ventricle. There was a slight roughening of the pericardium around the large vessels. The pericardial fluid was not increased.

When the right heart was opened there was extreme dilatation. The columnae carneae were extremely conspicuous. The papillary muscles were elongated and hypertrophied. The right auricle was markedly dilated. The tricuspid valve admitted four fingers. The pulmonary valve appeared normal. Both

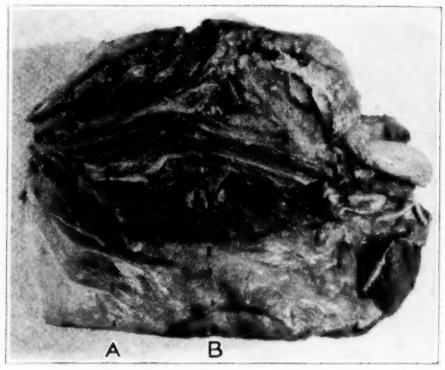


Fig. 4.—Relation of the calcified nodule in the myocardium and the left coronary artery, which was obstructed: *A*, left coronary artery; *B*, calcified nodule.

of the latter showed no structural changes. The pulmonary artery was markedly enlarged, so that it abutted against the third costal cartilage, to which it was adherent. The wall was thickened at this point but otherwise appeared normal. The left auricle was widely dilated and hypertrophied. The left ventricle was moderately dilated and the myocardium was extremely flabby, soft and necrotic. It had a dark gray appearance. The fibers seemed to be partially separated. This involved the entire left ventricle with the exception of a strip 2 or 3 cm. in width along the septum on the posterior surface. There were several large patches along the left side of the septum which presented the same appearance. The posterior cusp of the mitral valve was completely calcified (fig. 3), having a thickness of about 1 cm. The anterior cusp was markedly fibrotic, with some calcified nodules. The mitral orifice formed a semilunar slit about 2 cm. in length. The consistency of the valve cusps appeared not to permit opening of the valve during diastole.

The aortic valve showed some thickening and calcification. The sclerotic process involved about one half of the width. The cusps were not adherent to each other at their points of attachment. Apparently the valve could not close completely, but nearly so. The aorta, except for a few soft yellow plaques, was smooth and elastic.

The orifice of the right coronary artery was patent and the wall was smooth and free from sclerosis and atheromas. The left coronary artery presented a patent orifice and its walls were also free from calcification and atheromas of any of the

larger branches. There was a calcified nodule (fig. 4) about the size of a grain of wheat (2 mm. by 1 mm.) lying just at the upper margin of the left ventricle. This was placed with the long axis at about right angles to the ventricular wall. One end could be palpated just below the anterior cusp of the mitral valve slightly to the left of the juncture of its anterior and posterior cusps. The other end projected through the attenuated layer of the ventricular wall at the auriculoventricular junction, so that it pressed against the left coronary artery and thereby obstructed it. At this point the intima of the left coronary artery was a deep red. This change was present throughout the larger branches. These vessels were empty and contained no blood. Apparently, with dilatation and fibrillation, sufficient pressure was exerted on the coronary artery to obstruct it completely. The clinical course would lead one to believe that earlier this obstruction may have been intermittent.

Microscopic examination of the myocardium of the left ventricle was as follows: The muscular fibers were separated and distinctly less compact. Fragmentation and degeneration of the fibers were conspicuous. This was not a simple lack of continuity due to fixation and cutting, but the loose ends showed poor staining qualities. The cytoplasm was granular or vacuolated. In some places the frayed edges bridged a gap in the muscle fibers. In other places one or several fibers showed a similar degenerative change along their course. Between some fibers there were several small areas of a cellular detritus and a few lymphocytes and polymorphonuclears, apparently the site of serous deposit. The endothelial layer of the larger arteries was largely desquamated and was partially covered with a hemorrhagic exudate.

Other autopsy changes consisted of infarcts of the lungs in various stages of degeneration and a chronic passive congestion of the liver and kidneys.

803 City National Bank Building.

AN UNUSUAL OVARIAN TUMOR CONTAINING AN ESTROGENIC HORMONE

SAMUEL H. GEIST, M.D., AND FRANK SPIELMAN, M.D.,
NEW YORK

Löffler and Priesel [1] have described a group of six tumors which, because of well defined morphologic characteristics, they concluded arose from cells in the ovarian stroma, representing the forerunners of the theca interna cells.

More recently Melnick and Kanter [2] reported two additional cases and suggested, on hypothetical grounds, that these tumors contained an estrogenic hormone.

These tumors occur most commonly in the postmenopause and are associated with atypical uterine bleeding. The latter symptom was believed to be due to the hormone activity of the tumor. In a later publication this tumor group will be more extensively discussed, but at the present we report a case of this type, the ninth case to be recorded and the first in which an estrogenic hormone was demonstrated in the actual tumor tissue.

REPORT OF CASE

Mrs. J. H., aged 21, had been married four years and never been pregnant. Her menstrual periods had begun at 11 and up to the age of 16 were regular and normal. From her 16th to her 17th year she bled daily. Since she was 17, up to a few months before admission, she had bled every other week, the periods lasting from five to six days. For the past few months she had been bleeding almost daily and for the past four weeks had been amenorrheic.

The physical examination was negative except for the rather excessive breast development and the presence of a firm left sided pelvic mass the size of a peach. A diagnosis of a solid ovarian tumor was made.

At operation a left salpingo-oophorectomy was done, removing an ovarian tumor, firm, irregular on its surface and about the size of a peach. The uterus was enlarged, soft and succulent. The other ovary seemed grossly normal. Unfortunately no endometrium was obtained.

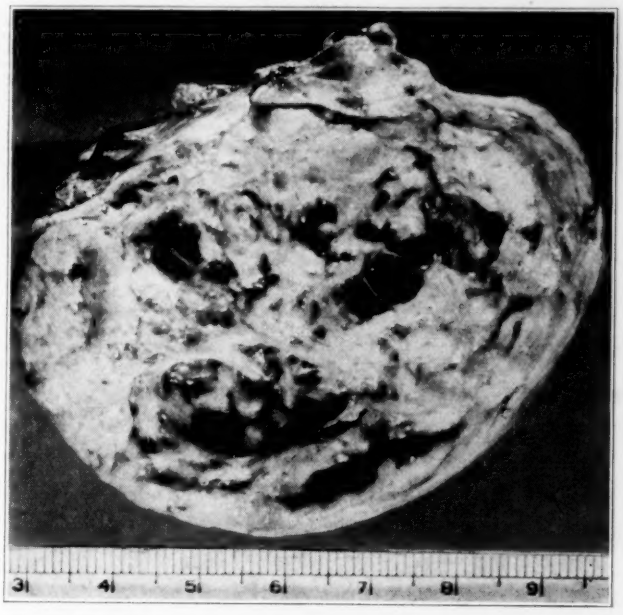


Fig. 1.—Gross tumor bisected, showing capsule, degenerative cystic areas and fibrous bundles in solid area to the left.

The tumor (fig. 1) weighed 68 Gm. and measured 7 by 4.5 by 6 cm. It was encapsulated and presented no defect in the capsule. A small simple cyst 1.5 cm. in diameter was present on the surface. The tumor was elastic in consistency and was a yellowish white.

Fig. 2.—Connective tissue areas with few spindle cells and one cellular area (upper center about vessel).

On section it was seen to be composed of a firm yellowish gray tissue, lobulated and fibrous. The fibrous tissue septums radiated in all directions, dividing the tumor tissue into islands of varying size. There were numerous cystic areas distributed throughout the growth.

From the Gynecological Service and Laboratory, Mount Sinai Hospital.

1. Löffler, E., and Priesel, A.: Beitr. z. path. Anat. u. z. allg. Path. **90:** 199, 1932.

2. Melnick, P. J., and Kanter, A. E.: Am. J. Obst. & Gynec. **27:** 41 (Jan.) 1934.

Histologically the tumor was composed of areas of hyalinized connective tissue (fig. 2) that contained comparatively few cells. In some of the areas islands of large plump spindle cells (figs. 2 and 3) were present, and in others the cells were polygonal (fig. 4). The nuclei were rounded or elongated, the cells having an epithelioid appearance. About the vessels there

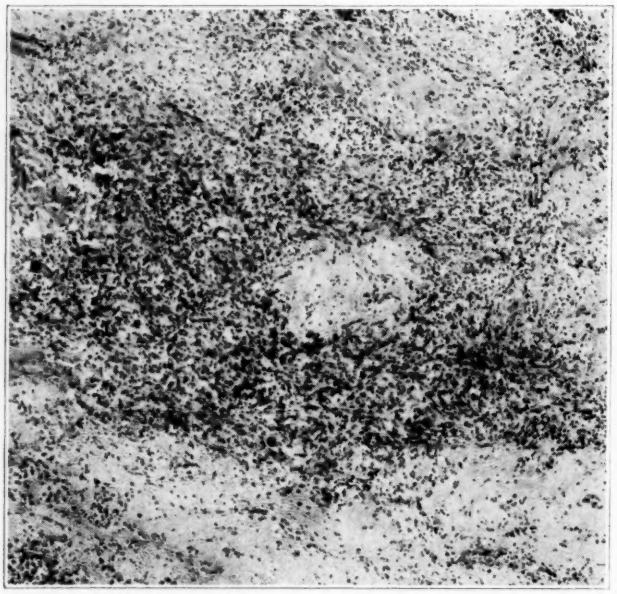


Fig. 3.—Connective tissue areas with one cellular island.

seemed to be a tendency for these cells to persist in large numbers.

The cells in many instances contained varying sized vacuoles. Fat stains showed that the vacuoles were lipoid material and

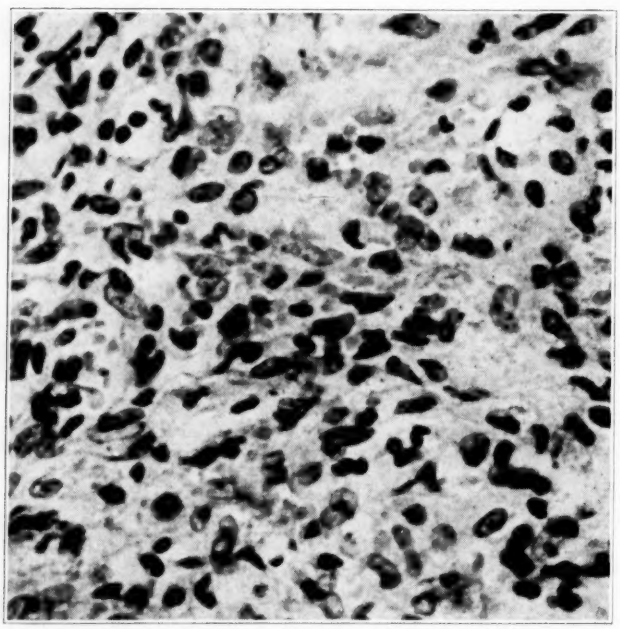


Fig. 4.—Large epithelioid vacuolated cells comprising the cell islands.

that even between the cells fat droplets were present (fig. 5). The polariscopic examination identified much of this lipoid material as double refractile; i. e., cholesterol.

The gross appearance, the histologic characteristics and the presence of lipoid were the same as described by the authors previously mentioned, who concluded that these tumors were neoplasms arising from the precursors of the theca interna cells.

Thirty-two grams of this tumor was extracted with alcohol and ether; the extract was then taken up in oil and titered for the presence of an estrogenic hormone. A positive reaction in the castrated mouse was obtained with 0.75 Gm. of tumor tissue. It was thus found that in the 32 Gm. extracted 48 mouse units of the hormone was present. This amount more than equals the quantity found in an equal weight of placenta. Associated with this excessive hormone content there was almost constant bleeding and breast hypertrophy.

The fluid from the cystic areas, which apparently represent a degenerative process in an amount up to 0.5 cc., did not contain a mouse unit of hormone.

It is evident that neoplasms may arise from the ovarian stroma of varying histologic appearance, which have the capacity of either storing or producing an estrogenic substance. The granulosa cell tumors form one group and the type here described, designated by Löffler and Priesel as fibroxanthoma thecocellular, or as we prefer to call them theca cell tumors, is another.

Following the operative removal of the tumor five months ago the patient has remained well. She had three normal

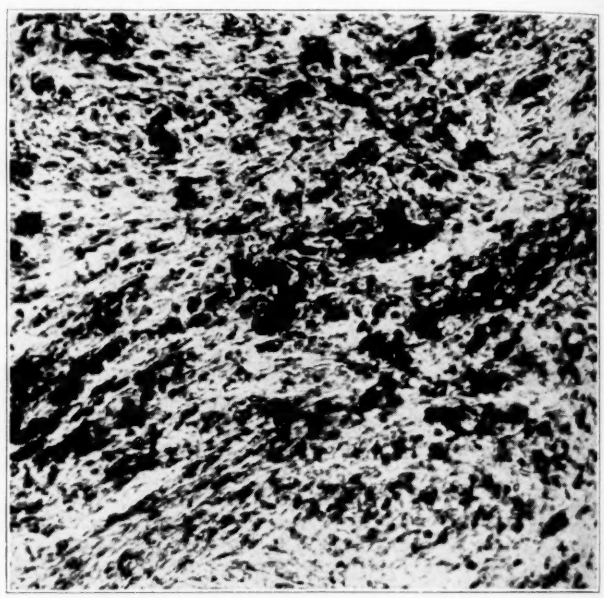


Fig. 5.—Sudanophile granules and masses in and between the cells.

menstrual periods at twenty-eight day intervals and of from four to five days' duration. The breasts have become somewhat smaller.

COMMENT

The presence of so large a quantity of estrogenic hormone within the tumor must lead to the conclusion that this was the factor directly associated with the excessive bleeding which the patient experienced. The prompt return to a normal period type after the removal further suggests a hormone influence. Likewise, the breast hypertrophy may be directly related to the excessive hormone content. As to the tumor itself, the histologic characteristics as well as the presence of lipoid place it in the group described by Löffler and Priesel. It is evident that neoplasms giving varied histologic pictures and having the ability either to store or to produce an estrogenic hormone may arise from the ovarian stroma. The granulosa cell tumors, which also produce the hormone, form one group, and the type here described and called theca tumors forms another.

CONCLUSION

Investigations of the hormone activity of ovarian neoplasms has aided in producing a more definite classification of tumors of the ovary and has shed more light on the pathologic physiology involved.

100 East Seventy-Fourth Street.

ABDOMINAL PREGNANCY

REPORT OF A CASE WITH A FULL TERM LIVING INFANT AND RECOVERY OF THE MOTHER

J. R. EISAMAN, M.D., AND C. E. ZIEGLER, M.D., PITTSBURGH

Although the occurrence of abdominal pregnancy is frequently reported, it is uncommon to note the birth of a full term living infant delivered from such a gestation. Only three proved cases of abdominal pregnancy have been found among 28,253 deliveries at the Elizabeth Steel Magee Hospital.

By a survey of the literature from 1809 to 1919, and questionnaires to 200 obstetricians, Beck [1] was able to collect only 262 cases of extra-uterine pregnancy after the fifth month with a living infant. Because of its exceptional nature, the case reported here is given in detail.

REPORT OF CASE

History.—M. Y., a white woman, aged 23, a secundigravida, referred to the service of Dr. C. E. Ziegler at the Elizabeth Steel Magee Hospital by Dr. W. H. Goodpastor, Sept. 5, 1933, had a spontaneous delivery of a full term baby seven years before. Otherwise her history was irrelevant. Her last normal period was Nov. 28, 1932, and the estimated date of confinement, Sept. 8, 1933. During her pregnancy she complained of some discomfort over the symphysis pubis, and constipation; but no history of pain, bleeding or other symptoms of tubal pregnancy or rupture could be elicited.

Physical Examination.—The patient was well developed and nourished and complained of no subjective symptoms or abdominal pain. Examination of the head, neck and chest revealed no pathologic lesions. Pelvic measurements were normal.

The fundus of the uterus was believed to be 25 cm. in height. The fetus occupied an oblique position (right scapulo-

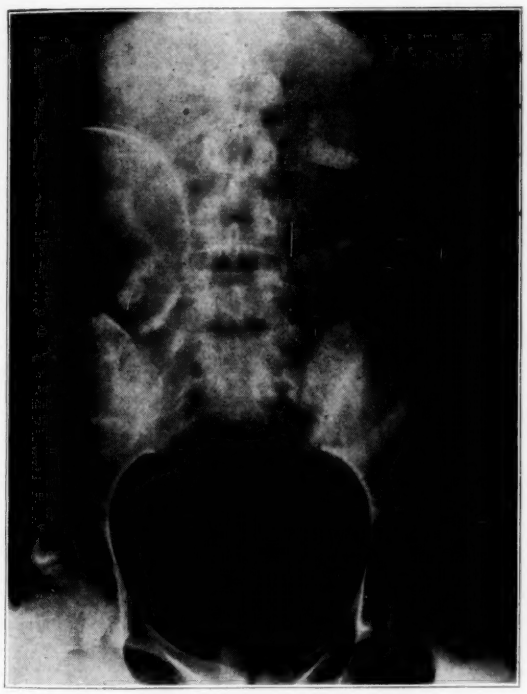


Fig. 1.—Fetus lying in the right scapulodorso-anterior position. Note absence of normal globular uterine shadow.

dorso-anterior), the fetal head lay in the right flank, small parts were easily palpated and fetal heart sounds were clearly heard in the lower right abdominal quadrant. External version was not completed, owing to difficulty in dislodging the fetus and elevation of the fetal heart rate by the manipulation.

By rectal examination a mass was found which occupied the left side of the pelvic inlet. This was about 10 cm. in diameter, solid, mobile, and at first was believed to be an ovarian tumor or pedunculated uterine fibroid. There was no presenting part in the pelvis.

By vaginal examination, under anesthesia, this mass could not be felt, but the posterior culdesac was filled by a semi-

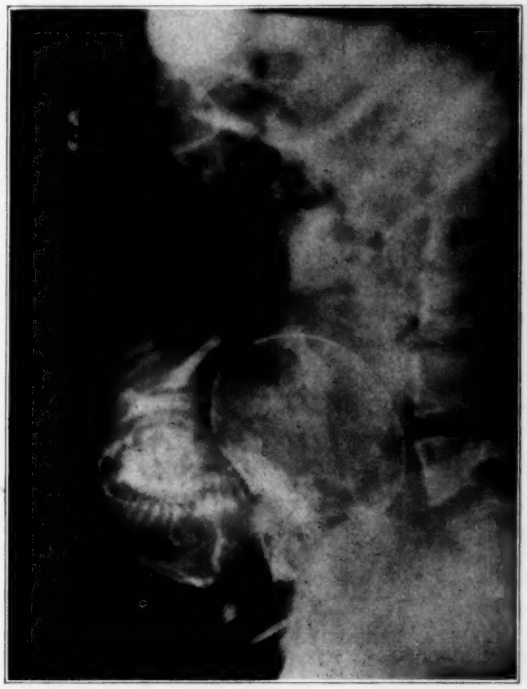


Fig. 2.—Lateral view, showing the relatively superficial position of the fetus. Fetal parts are not obscured by the normal quantity of amniotic fluid.

solid or cystic mass, later proved to be placenta. The cervix uteri was long, soft and patulous, but because of impending cesarean section was not explored. Roentgenograms showed the fetus to be lying in a transverse position with the head to the right side and back anterior. The fetal parts were not obscured by the usual amniotic fluid. The rounded outline of the uterus was not visible.

The physical changes of a high transverse presentation of the fetus, superficial fetal parts and heart sounds, and detected pelvic mass in conjunction with the roentgenograms led to the diagnosis of abdominal pregnancy. The patient was scheduled for laparotomy the following morning, but that evening she complained of abdominal cramps and there was some vaginal bleeding. She was prepared for immediate operation.

Operation.—The vagina and abdomen were prepared with tincture of merthiolate. A midline suprapubic incision was made. The peritoneum was opened, with the escape of a large quantity of straw-colored fluid; and a large mass believed, on first sight, to be the uterus, was apparent. This, however, had the mottled greenish appearance of the fetal surface of a placenta. Throughout its wall were many fine interlacing blood vessels, and through these the fetal parts could be seen.

On closer examination the intact uterus, comparable to that of a six weeks pregnancy, was detected lying behind the symphysis pubis. It was now clear that we were dealing with an abdominal pregnancy. Arising from the vicinity of the right uterine cornu and directed diagonally upward across the amniotic sac was a heavier, more muscular band, probably the thinned out right fallopian tube. The sac was not adherent to adjacent parts except in the right side of the pelvis, in the posterior culdesac and to the descending colon. The right ovary was not seen.

The sac was incised, with the escape of an almost imperceptible amount of amniotic fluid and very little bleeding. A living male infant, weighing 7 pounds 2 ounces (3,232 Gm.) was

Read before the Allegheny County Medical Society, April 17, 1934.
From the Department of Obstetrics, Elizabeth Steel Magee Hospital.

1. Beck, A. C.: Treatment of Extra-Uterine Pregnancy After the Fifth Month, J. A. M. A. **73:** 962 (Sept. 27) 1919.

extracted by the breech and resuscitated with some difficulty. The membranes of the amniotic sac were extremely thick and tough. The placenta was greatly enlarged and of dumb-bell shape. The lower lobe to which the cord was attached was the larger and was firmly attached to the posterior surface of the uterus and broad ligament and to the right wall of the pelvis. The upper lobe, measuring 16 by 16 by 3 cm., was included in the posterior wall of the sac and had no attachment to any structure other than the remainder of the placenta, and to this by a narrow isthmus of placental tissue. Remnants of the umbilical cord and membranes were removed after clamping and double ligating with number 2 chromic catgut. The

Fig. 3.—Relative position of fetus, placenta and uterus. The upper portion of the placenta had no maternal attachment.

nonadherent upper lobe of the placenta was amputated after the pedicle was clamped and ligated with sewed in number 2 chromic sutures. The lower lobe of the placenta was undisturbed.

The peritoneum was closed with number 2 chromic catgut, without drainage. Muscle and fascial sutures were of chromic gut. The skin was closed with a plain catgut suture. The patient returned to the ward in good condition.

For two weeks, convalescence was uneventful. After this there was a gradual elevation of temperature, accompanied by definite fulness and extreme tenderness to the right of the incision. This condition was relieved by the evacuation of a large quantity of purulent exudate. Drainage from the wound continued for some days. Because of the placental tissue left within the abdomen, it is of interest to know that the Aschheim-Zondek reaction was negative after eight days.

The baby, although at first lethargic, showed no abnormality other than a small hematoma of the left sternomastoid muscle. On discharge from the hospital it weighed 11 pounds 5 ounces (5,132 Gm.). A roentgen examination of the injected uterus before discharge from the hospital, December 3, showed an irregular uterine cavity and iodized poppy-seed oil distributed about both sides of the pelvis. The left tube was outlined and was directed upward. Most of the iodized oil was collected in sinuses in the pelvis.

Pelvic examination, Jan. 17, 1934, showed the uterus to be enlarged and mobile. The cervix was soft and patulous, and absorption of placenta and exudate has been so complete that no evidence of a pelvic inflammation or fulness could be detected in either side of the pelvis. Injection of the uterus with iodized poppy-seed oil is shown in figure 1.

CONCLUSION

The birth of a full time living infant and recovery of the mother after abdominal pregnancy is so rare as to justify reporting every case. Although this instance affords no evidence of early tubal or ovarian implantation, to state that it was primary in type would be purely a conjecture.

Treatment of such a condition should include laparotomy, extraction of the fetus, removal of the membranes and cord after ligation, noninterference with the placenta, and, in the absence of infection, closure of the abdomen without drainage.

3708 Fifth Avenue.

GONORRHEAL TENOSYNOVITIS OF THE LONG HEAD OF THE BICEPS BRACHII

DIAGNOSIS MADE BY DEMONSTRATING GONOCOCCI IN THE TENDON SHEATH

ISADORE ZADEK, M.D., NEW YORK

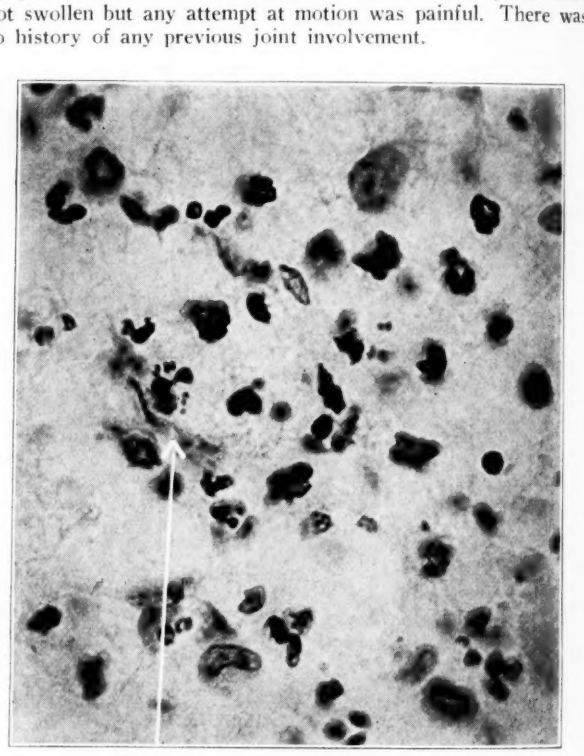
This case illustrates a method of diagnosis that is seldom utilized; namely, the demonstration of organisms in the tissues. I have been unable to find a record of an identical case.

J. L., a woman, aged 22, admitted to the Hospital for Joint Diseases, Feb. 11, 1934, in the medical service, complained of pain in the left shoulder and chills and fever of twenty-four hours' duration.

She had typhoid at the age of 4 years. She had the usual diseases of childhood. She stated that she had never had syphilis or a gonorrheal infection.

The patient had been married one and a half years and was separated from her husband. She had had two abortions, one at three and a half months and another at five months. They were both spontaneous.

The night previous to admission, February 10, without any premonitory symptoms, she developed chills and fever, followed by pain in the left shoulder and both knees. These joints were not swollen but any attempt at motion was painful. There was no history of any previous joint involvement.



A section of the tendon sheath showing the inflammation and diplococci in the polymorphonuclear leukocytes.

When seen at the Hospital for Joint Diseases the patient complained of pain in the left shoulder. The left shoulder was swollen. Any attempt at motion caused excruciating pain. A greenish purulent vaginal discharge was present. Examinations of smears from this discharge were negative for gonococci.

The patient was treated by rest in bed and local applications and was given codeine and salicylates. There was no cardiac involvement and the case was considered to be an atypical arthritis.

The temperature on admission was 102 F. The next day it dropped to 98.6; February 15 it was 102.8. From February 18 to the 24th the temperature varied between 100 and 103.

The patient failed to improve and was transferred to the orthopedic service of Dr. Samuel Kleinberg, February 15. At this time the left shoulder was diffusely swollen and was sensitive to pressure anteriorly. Anteroposterior motion of the shoulder was fairly free. Abduction and outward rotation were markedly limited and painful. The condition was considered to be an acute subdeltoid bursitis, probably of gonorrheal origin. An attempt was made to aspirate the bursa, but no fluid was obtained. A Velpeau bandage was applied.

February 16 the left shoulder was stretched under anesthesia and a plaster-of-paris shoulder spica was applied with the shoulder in 70 degrees of abduction. The patient felt better but continued to have a fever.

February 12 the white blood cell count was 8,000, with polymorphonuclear leukocytes 69 per cent. February 24 the white blood count was 12,800, with polymorphonuclear leukocytes 77 per cent. March 7 the white blood count was 6,200, with polymorphonuclear leukocytes 65 per cent, the temperature at this time being normal.

February 13 the blood Wassermann and gonorrheal complement fixation tests were negative.

February 26 the patient's temperature rose to 104 F. The shoulder spica was bivalved and removed. A roentgen examination showed an area of rarefaction in the greater tuberosity. It was questionable whether this was of any significance. On this day I explored the shoulder through an anterior incision 3 inches long. The tissues were all quite vascular. The greater tuberosity was explored by turning back a flap of bone with a mallet and chisel. The bone was normal. This flap was replaced and counter-sunk. The distended sheath of the long head of the biceps tendon was opened for a distance of 2 inches. It contained a small amount of thin pus. The tendon was found frayed near the upper pole of the bicipital groove. The tendon was white and had lost its glistening appearance. The sheath throughout its exposed area was lined with granulation tissue. A culture of the pus was made and a portion of the sheath was sent to the laboratory for microscopic examination. The wound was packed with petrolatum gauze. The bivalved plaster-of-paris spica was replaced.

The patient's postoperative course was uneventful. She was given a transfusion, March 3, and discharged from the hospital March 21, wearing a plaster-of-paris shoulder spica.

The culture made at the time of operation was negative. The tendon sheath was reported to show granulation tissue infiltrated with various cellular elements.

The patient was followed in the outpatient department. May 1, I examined the patient and reviewed her history. I was struck by our suspicions of this being a gonorrheal infection. All our examinations had been inconclusive. The laboratory had retained the tissue removed at operation. New sections were cut from the sheath of the tendon and a gram stain was made which showed numerous pus cells with intracellular gram-negative biscuit shaped diplococci.

In brief, this was a case of gonorrheal tenosynovitis of the long head of the biceps brachii in which the diagnosis rested solely on the demonstration of the organisms in the substance of the tendon sheath.

1095 Park Avenue.

Specialists in Ancient Times. — It is likely that many skilful and sagacious medical men practiced in ancient Egypt, where—Herodotus tells us—physicians were even more highly specialized than they are today, since often they limited themselves to a single organ of the body. There were dentists, as well as internists and surgeons. Hippocrates, however, is the first great physician from whom we have records and writings which show an approach to medical problems entirely analogous to our own. Indeed, his descriptions of cases in the Epidemion are so precise that diagnoses more accurate than the ones he made himself can be deduced from his clinical histories.—Zinsser, Hans: Rats, Lice and History, Boston, Little, Brown & Co., 1935.

Special Articles

GLANDULAR PHYSIOLOGY AND THERAPY

THE ADRENAL CORTEX

ROBERT F. LOEB, M.D.
NEW YORK

NOTE.—*This article and the articles in the previous issues of* THE JOURNAL *are part of a series published under the auspices of the Council on Pharmacy and Chemistry. Other articles will appear in succeeding issues. When completed, the series will be published in book form.*—ED.

It has been known for many years that destruction of the adrenal glands in the human being, or complete ablation of these structures in most animal species, results in death. Following the isolation and synthesis of epinephrine, it was shown that this secretion of the adrenal medulla would not maintain life. In human beings suffering from severe Addison's disease, as well as in totally adrenalectomized animals, this hormone, regardless of the dose or means of administration, proved to have little if any therapeutic effect. In experimental animals, extirpation of one adrenal and destruction of the medulla in the other led to no apparent deleterious effects; such animals survived indefinitely. Removal or destruction of both cortices, however, in the absence of sufficient accessory tissue, invariably caused death. Thus it was established that another substance present in the cortex of the adrenal gland was essential for life. Further proof of the validity of this idea was provided by the extraction of such a hormone and the demonstration that it would insure the survival of the adrenalectomized animal.

PREPARATION AND ASSAY OF CORTICAL HORMONE

In October 1927 Rogoff and Stewart [1] and Hartman,[2] independently, published that they had produced extracts of the adrenal cortex which definitely prolonged the lives of adrenalectomized dogs and cats, though the former had reported their observations two years earlier. The method of Rogoff and Stewart consisted of extracting dogs' adrenals with 0.9 per cent salt solution and glycerin; these authors proposed the name "interrenalin" for the hormone of the adrenal cortex essential for life. Hartman's preparation, called "cortin," consisted of a saline extract of beef adrenals, from which most of the protein was removed by iso-electric precipitation.[3] The average survival time of animals

From the Department of Medicine of the Columbia University College of Physicians and Surgeons, and the Presbyterian Hospital.

1. (*a*) Rogoff, J. M., and Stewart, G. N.: The Influence of Adrenal Extracts on the Survival Period of Adrenalectomized Animals, Science **66**:327 (Oct.) 1927. (*b*) Studies on Adrenal Insufficiency: V. The Influence of Adrenal Extracts on the Survival Period of Adrenalectomized Dogs, Am. J. Physiol. **84**: 660 (April) 1928. (*c*) Stewart, G. N., and Rogoff, J. M.: Studies on Adrenal Insufficiency: IX. The Influence of Extracts of Adrenal Cortex (Sheep and Cattle) on the Survival Period of Adrenalectomized Dogs and Cats, ibid. **91**: 254 (Dec.) 1929. (*d*) Rogoff, J. M.: Clinical and Experimental Studies on Adrenal Insufficiency and Addison's Disease and the Treatment of Such Conditions by Interrenalin, Proc. California Acad. Med., 1930, p. 7; Diagnosis and Treatment of Addison's Disease, Canad. M. A. J. **24**: 43 (Jan.) 1931; Addison's Disease: Further Report on Treatment with "Interrenalin" (Adrenal Cortical Extract) J. A. M. A. **99**: 1309 (Oct. 15) 1932.

2. Hartman, F. A.; MacArthur, C. G., and Hartman, W. E.: A Substance Which Prolongs the Life of Adrenalectomized Cats, Proc. Soc. Exper. Biol. & Med. **25**: 69 (Oct.) 1927.

3. Extracts of the adrenal cortex prepared by iso-electric precipitation as described by Hartman have been found by other workers to be practically or entirely inactive.[1c] Subsequent publications by Hartman (Proc. Soc. Exper. Biol. & Med. **27**: 938 [June] 1930; **28**: 962 [June] 1931) concern extracts prepared by the use of certain lipoid solvents (Hartman, F. A.: U. S. Patent 1,914,125 [June 13, 1933]—process patent for "Cortin and Method of Preparing Same").—ED.

treated with these preparations was at least two and three times that of control animals.[4] Pfiffner and Swingle [5] in 1929 prepared an extract of the cortex of beef adrenal glands by means of organic solvents. This extract, injected in lipoid form, extended the life of the adrenalectomized cat from an average duration of seven days to about thirty days,[4] at which time the preparation caused severe irritation of the subcutaneous tissues. In recent years this method of preparation has been improved so that animals will survive for years with the administration of smaller amounts. In the last four years other methods of preparation of the cortical hormone have been developed, and recently Kendall [6] has reported that he has isolated this substance in crystalline form.[7] This preparation is believed to have a molecular weight of 350 and the empirical formula $C_{20}H_{30}O_5$. The observations of Kendall have not as yet been confirmed in other laboratories. It is not even certain at the present time that the active principle of extracts of cortical substance used experimentally represents a single chemical unit.

One other substance, vitamin C, was isolated in crystalline form in large amounts from the cortex of the adrenal glands by Szent-Györgyi [8] in 1929. This compound has since been obtained from various other sources and its structure proved by synthesis. Originally it was designated "ascorbic acid"; more recently the Council on Pharmacy and Chemistry has proposed the name "cevitamic acid." It is believed that the high concentration of vitamin C in the adrenal cortex may result from storage rather than from local synthesis, and its significance is still uncertain.

The problem of assaying the various preparations of the cortical hormone essential for life is of vital importance both for physiologic study and for clinical therapy. Unfortunately up to the present time only biologic methods can be employed. These have distinct limitations because of the wide individual variations among animals and also because of the great influence of physiologic and environmental factors such as the amount of sodium ingested, the amount of fluid administered or the type of diet employed, which may not be adequately controlled. A number of methods of assay have been suggested, most of these depending on the determination of changes in concentration of some constituents of the blood from a test animal. The cortical hormone has no demonstrable influence on the blood of a normal animal, and therefore testing must be carried out on those completely adrenalectomized. One method of assay consists in the determination of the amount of an extract necessary to prevent an increase of 100 per cent in the blood urea of an adrenalectomized dog in the course of from seven to ten days.[9] The "dog unit" is defined as the minimum daily dose of an extract per kilogram of body weight necessary to prevent this increase in blood urea.[10]

Cortical extracts have usually been administered parenterally,[11] as it has been claimed that these are at least twelve times as efficient by this route as when given orally.[9]

FUNCTIONS OF THE CORTICAL HORMONE

There has been much speculation concerning the function of the adrenal cortex. Britton and Silvette [12] have postulated that "the adrenal cortex prepotently regulates carbohydrate metabolism." [13] Swingle and Pfiffner,[12] as well as others, have intimated that the primary function of the adrenal cortex is to regulate the circulating blood volume. In 1931 Swingle [14] wrote: "At the outset of this discussion the statement was made that the function of the adrenal cortex is a mystery. And so it is!" Careful clinical and physiologic studies of recent years have not solved the problem, but they suggest that more than one function exists.

Until the cortical hormone or hormones are definitely available in large amounts in crystalline form, the functions of the adrenal cortex will remain shrouded in mystery and confusion.

The study of the sequence of events occurring in human beings and in adrenalectomized animals during the development of acute adrenal insufficiency and subsequently following the administration of cortical extract or sodium chloride or both has, however, contributed a considerable amount of information.

Sodium Loss and Dehydration.—When the adrenal glands of an animal are removed, or when injections of cortical extract are withdrawn from an adrenalectomized dog, the complete picture of adrenal insufficiency develops in the course of a few days. The time relationships occurring in the development of a number of the physiologic disturbances are shown in the accompanying chart, prepared by Harrop.[15] These changes and others to be enumerated may be correlated, wholly or in part, with the fact that the adrenal gland appears

4. The survival times of treated adrenalectomized animals reported by Stewart and Rogoff [1a, b] considerably exceed the maximum (not only the average) for control animals in their own extensive series. However, the average survival time of control adrenalectomized animals reported by Hartman [2] was taken largely from the literature and hence may not properly be compared with the survival times for his treated animals. It should be noted that the survival times reported by different authors are not comparable; survival times of animals under treatment with cortical extract must be compared with those of untreated animals of the same investigator. Thus, the longest periods of survival of untreated animals reported in the literature (those of Stewart and Rogoff) exceed in many cases the survival times of treated animals reported by other workers.—ED.

5. Pfiffner, J. J., and Swingle, W. W.: The Preparation of an Active Extract of the Suprarenal Cortex, Anat. Rec. **44:** 225, 1929. Swingle, W. W., and Pfiffner, J. J.: Experiment with an Active Extract of the Suprarenal Cortex, ibid. **44:** 225, 1929.

6. Kendall, E. C.; Mason, H. L.; McKenzie, B. F., and Myers, C. S.: Isolation in Crystalline Form of the Hormone Essential to Life from the Suprarenal Cortex: Its Chemical Nature and Physiologic Properties, Proc. Staff Meet., Mayo Clin. **9:** 245 (April 25) 1934.

7. Crystalline products from extracts of the adrenal cortex have also been reported by other investigators, notably by Wintersteiner and Pfiffner (Proc. Soc. Biol. Chem., April 10-13, 1935, page c). However, in view of the multiplicity of crystalline fractions reported both by Kendall and by Wintersteiner, and the apparent great variability in the claimed activity of the different fractions, none of the crystalline products may as yet be considered to represent the life-sustaining hormone of the adrenal cortex.—ED.

8. Szent-Györgyi, A.: On the Chemistry of the Adrenal Cortex. Abstracts of Communications to the Thirteenth International Physiological Congress, August 1929, p. 265.

9. Pfiffner, J. J.; Swingle, W. W., and Vars, H. M.: The Cortical Hormone Requirement of the Adrenalectomized Dog, with Special Reference to a Method of Assay, J. Biol. Chem. **104:** 701 (March) 1934.

10. This is not an entirely satisfactory method of assay, as several authors have pointed out. It appears that the only adequate criterion now available for the activity of adrenal cortical extracts consists in the property of prolonging the lives of completely adrenalectomized animals for a period well beyond the maximum survival time of control animals.—ED.

11. Extracts have been prepared that are active by mouth (Rogoff and Stewart[25]). Oral administration has the advantage of avoiding, largely or entirely, the toxic effects of contaminating substances, such as have been reported following parenteral injection by Benham (Benham, H. W.; Fisher, Mary and Thurgar, C. J. L.: Three Cases of Addison's Disease Treated with an Extract of Suprarenal Cortex, Lancet **1:** 125 [Jan. 16] 1932) and by Rowntree (Rowntree, L. G. and Ball, R. G.: Diseases of the Suprarenal Glands, Endocrinology **17:** 263 [May-June] 1933) in human beings and by Rogoff [26] in animals.—ED.

12. Britton, S. W., and Silvette, H.: On the Function of the Adrenal Cortex—General Carbohydrate and Circulatory Theories, Am. J. Physiol. **107:** 190 (Jan.) 1934. Swingle, W. W.; Pfiffner, J. J.; Vars, H. M.; Bott, P. A., and Perkins, W. M.: The Function of the Adrenal Cortical Hormone and the Cause of Death from Adrenal Insufficiency, Science **77:** 58 (Jan.) 1933.

13. Britton and Silvette (Am. J. Physiol. **100:** 701 [May] 1932) have written: "Since the cortex represents that part of the organs which is pre-eminently essential to life, the conclusion is derived that the regulation of carbohydrate metabolism may be considered as the prepotent function of the adrenal glands." Presumably, "prepotent" is intended to mean "pre-eminently potent." See also footnote 18.—ED.

14. Swingle, W. W.: The Cortical Hormone of the Adrenal Gland, Harvey Lectures, series 27, October 1931, p. 33.

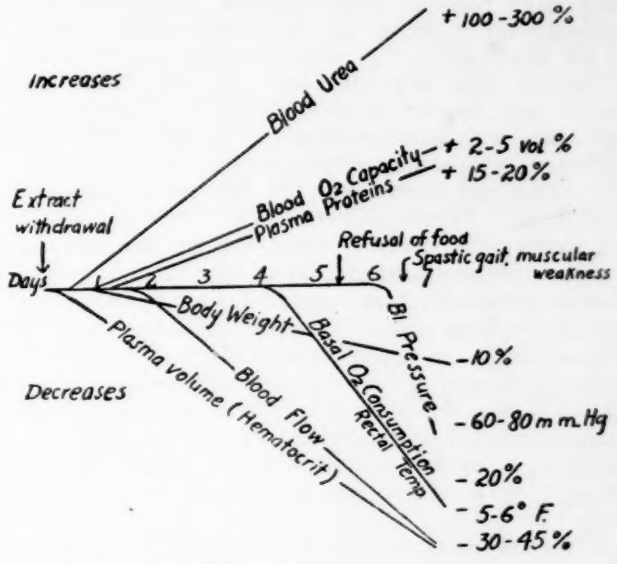
15. Harrop, J. A.; Weinstein, A.; Soffer, L. J., and Threscher, J. H.: Studies on the Suprarenal Cortex: II. Metabolism, Circulation and Blood Concentration During Suprarenal Insufficiency on the Dog, J. Exper. Med. **58:** 1 (July) 1933.

to exert a controlling influence on sodium metabolism.[16] Early in the course of adrenal insufficiency the rate of sodium excretion through the kidney is increased and the concentration of this ion in the blood serum falls. Accompanying the decrease in sodium there is a decline in the concentration of chloride or bicarbonate or both. As sodium is lost from the body there is an increased, though not an equivalently increased, excretion of water. This progressive loss of salt and water leads to the depletion of the circulating fluid volume and of the fluid within the extracellular tissue spaces. The latter in turn leads to a further and critical decrease in blood volume, with the development of a state of shock.

The significance of the disturbance in sodium metabolism in the production of the picture of acute adrenal insufficiency is clearly seen in patients with outspoken Addison's disease. When no change other than the withdrawal of salt from the diet is instituted in the regimen of these patients, there results a characteristic chain of events. When adrenal insufficiency is established, the administration of salt may bring about improvement, just as the administration of cortical extract or salt does in the adrenalectomized animal.

The following changes may be ascribed to the loss of sodium with its accompanying dehydration: (1) decrease in concentration of sodium in the blood with a fall in blood bicarbonate or chloride or both; (2) increase in plasma protein concentration and in the oxygen capacity of the blood; (3) decrease in plasma volume; (4) decrease in rate of blood flow; (5) increase in excretion of chloride; (6) loss of weight. In turn, this resultant state of dehydration and shock is also probably of importance in augmenting the following manifestations of adrenal insufficiency: (7) refusal of food; (8) vomiting; (9) muscular weakness; (10) diminution in blood pressure; (11) diminution in metabolic rate;[16a] (12) increase in total nonprotein nitrogen of the blood and often in urea, and increase in phosphate and sulphate in advanced stages, and (13) anuria when shock is extreme.

Renal Function—In 1916 Marshall and Davis[17] first demonstrated an increase in blood urea and a decrease in phenolsulphonphthalein excretion following total ablation of the adrenal glands. They suggested that the secretion "of some substance by the adrenals which is necessary for the maintenance of normal renal function serves as a probable explanation . . ." of the results obtained. Since that time it has been shown that the retention of total nonprotein nitrogen is an early and regular finding in adrenalectomized animals and that this abnormality is also usually encountered in the severe adrenal insufficiency of Addison's disease. Sulphate and phosphate retention also occur as the disorder progresses. It has been shown that at times urea retention occurs while the adrenalectomized animal is still clinically well, while the blood pressure is normal and while the urine volume is even greater than that present before any rise in blood urea occurs. Recent studies have shown that accompanying the increase in blood urea in the adrenalectomized dog whose dosage of cortical extract is reduced there is not only a decrease in phenolsulphonphthalein elimination but also a decrease in urea clearance. These changes occur before there is any weakness, lassitude or anorexia and disappear with increasing doses of cortical extract. Thus it is apparent that the disturbances in renal function are dependent on cortical and not on medullary insufficiency. The decrease in renal function may be dependent on an influence of cortical substance on the kidneys directly; dehydration and shock augment the state of renal insufficiency.



Characteristic changes in metabolism, circulation and blood concentration in a group of adrenalectomized animals following withdrawal of extract.

The excessive loss of sodium from the body following lack of adequate cortical substance takes place through the kidney and in this sense may be termed a disturbance of renal function. It is of interest that sodium chloride administered orally to the adrenalectomized dog receiving inadequate doses of cortical substance improves renal function in that the blood urea falls and phenolsulphonphthalein excretion rises, as does the urea clearance. Lack of cortical substance causes the following evidences of alteration in renal function: (1) increase in blood urea, creatinine, phosphate and sulphate; (2) decrease in urea clearance; (3) decrease in excretion of phenolsulphonphthalein, and (4) increase in the excretion of sodium.

Potassium Excretion.—Retention of potassium in the blood is a constant finding in adrenal insufficiency in animals and occurs in severe adrenal crises in human

16. Loeb, R. F.: Chemical Changes in the Blood in Addison's Disease, Science **76:** 420 (Nov.) 1932; Effect of Sodium Chloride in the Treatment of a Patient with Addison's Disease, Proc. Soc. Exper. Biol. & Med. **30:** 808 (March) 1933. Loeb, R. F.; Atchley, D. W.; Benedict, E. M., and Leland, J.: Electrolyte Balance Studies in Adrenalectomized Dogs with Particular Reference to the Excretion of Sodium, J. Exper. Med. **57:** 775 (May) 1933. Loeb, R. F., and Atchley, D. W.: The Significance of Salt in the Treatment of Addison's Disease, M. Clin. North America **17:** 1317 (March) 1934. Loeb, R. F.; Atchley, D. W., and Stahl, J.: The Rôle of Sodium in Adrenal Insufficiency, to be published. Stewart, G. N.: Blood Studies in Dogs After Adrenalectomy, J. Pharmacol. & Exper. Therap. **29:** 373, 1926. Rogoff, J. M., and Stewart, G. N.: Studies on Adrenal Insufficiency in Dogs: II. Blood Studies in Control Animals Not Subjected to Treatment, Am. J. Physiol. **78:** 683 (Nov.) 1926. Marine, David, and Baumann, E. J.: Duration of Life After Suprarenalectomy in Cats and Attempts to Prolong It by Injections of Solutions Containing Sodium Salts, Glucose and Glycerol, ibid. **81:** 86 (June) 1927. Rogoff, J. M., and Stewart, G. N.: Studies on Adrenal Insufficiency: IV. The Influence of Intravenous Injections of Ringer's Solution upon the Survival Period of Adrenalectomized Dogs, ibid. **84:** 649 (April) 1928. Harrop, G. A.; Soffer, L. J.; Ellsworth, R., and Threscher, J. H.: Studies on the Suprarenal Cortex: III. Plasma Electrolytes and Electrolyte Excretion During Suprarenal Insufficiency in the Dog, J. Exper. Med. **58:** 17 (May) 1933. Harrop, G. A.; Weinstein, Albert; Soffer, L. J., and Threscher, J. H.: The Diagnosis and Treatment of Addison's Disease, J. A. M. A. **100:** 1850 (June 10) 1933. Harrop, G. A.: The Diagnosis and Treatment of Addison's Disease, Correspondence, ibid. **101:** 388 (July 2) 1933.

16a. It should be pointed out that the studies which indicate a diminution of basal metabolic rate in adrenalectomized animals were made on animals the survival times of which were very short. The significance of such a decrease in oxygen consumption of moribund animals is conjectural, as no decrease in metabolic rate is said to occur during the period of relatively good health. See section on "Oxygen Consumption."—ED.

17. Marshall, E. K., and Davis, D. M.: The Influence of the Adrenals on the Kidneys, J. Pharmacol. & Exper. Therap. **8:** 525 (Sept.) 1916.

beings. Whether this represents merely a manifestation of renal insufficiency or a more general disturbance of potassium exchange through the cell membranes of the body is not known. It is conceivable that the increase in blood potassium or an alteration in the sodium-potassium ratio may contribute to the picture of collapse in an adrenal crisis.

Carbohydrate Metabolism.—Disturbances in carbohydrate metabolism have been recognized for many years as playing a prominent part in the syndrome resulting from total ablation of the adrenal glands. In Addison's disease, too, abnormalities of carbohydrate behavior such as depression of the blood sugar and increased sensitivity to small doses of insulin have been observed. Britton and Silvette[12] have studied this phase of adrenal insufficiency in various animal species. They found a decrease in the sugar content of the blood and a decrease in glycogen stores, particularly in the liver. They have reported that "emotion, excitement and [epinephrine] injection are practically without effect on the blood [sugar] of adrenalectomized cats tested at various time intervals after operation while the animals still appear in good health." Finally, they state that "with long-continued, twice daily, injections of [dextrose] during the period following adrenalectomy, there also occurs very little storage of glycogen in the liver." Despite this collection of evidence, doubt still exists as to whether these changes are not the result of medullary rather than of cortical deficiency.[18] This is particularly true because Britton[19] and others have shown that increased sensitiveness to insulin exists in those animals in which the adrenal medulla has been destroyed without serious damage to the cortex. Also, Harrop[19] has shown that increased sensitiveness to insulin persists in adrenalectomized dogs maintained by adequate doses of cortical extract. Unfortunately, glycogen determinations on the livers of these animals are not available.

The chief differences in carbohydrate disturbances between those animals with the medulla destroyed and those with the entire glands destroyed are found in the glycogen stores and the response to injection of epinephrine. The former show no depletion of liver glycogen and give a hyperglycemic response when epinephrine is administered during the hypoglycemic state. The latter, as previously stated, apparently have depleted glycogen stores and consequently are unable to exhibit as large an elevation of the blood sugar after injection of epinephrine.[20]

Oxygen Consumption.—It is well known that the basal metabolic rate of patients with severe Addison's disease and that of adrenalectomized animals showing signs of severe deficiency is decreased. The mechanism of this change is not yet clear, but the fact that it does not occur in animals until about four days after withdrawal of cortical extract suggests that it may be secondary to other disturbances such as dehydration. Fall in body temperature parallels the decrease in oxygen consumption and is possibly also dependent on the development of dehydration and shock.[16a] The sensitiveness to cold experienced by patients with relatively well "compensated" adrenal insufficiency cannot be explained at the present time.

Adynamia.—Muscular weakness and asthenia are probably the most important manifestations of adrenal insufficiency in man. These symptoms may be present to a marked degree even though quantitative measurements of cortical insufficiency as determined by the blood urea, the blood sodium and hemoconcentration may be normal. Whether this weakness results from cortical or medullary insufficiency is not certain, despite reports of improvement in patients following the administration of cortical extract. On the other hand, it has been shown by Ingle that the capacity for sustained work in adrenalectomized rats is enormously enhanced by cortical extracts, and certainly the adrenalectomized dog receiving adequate doses of this substance shows no evidence of muscular weakness. This evidence suggests but does not prove the importance of the adrenal cortex in maintaining muscle strength. The underlying mechanism involved in the relationship between muscle weakness and the adrenal glands is not known. It is clear that dehydration and shock serve only as contributing factors to weakness, because, as has already been stated, this symptom may be present to a marked degree without loss of base or urea retention. Furthermore, strength increases strikingly in the adrenalectomized dog following the administration of cortical extract before obvious changes occur in the blood urea or sodium concentration or in the water content of the blood serum.

Circulatory Collapse.—The importance of salt loss and dehydration has already been stressed as being of significance in promoting the state of shock in adrenal insufficiency. Swingle and his collaborators[12] have suggested that the absence of cortical substance produces a state of shock analogous to histamine shock in which capillary permeability is increased. The decrease in blood volume under these conditions is supposed to be due to the flow of fluid into the tissue spaces. The fact that salt and water are known to be lost from the body through the kidneys in large amounts would make the assumption of Swingle unnecessary.[21] In certain instances, however, the loss of base and water does not appear to be great enough to produce the profound peripheral circulatory collapse encountered. Consequently the fact must still be borne in mind that adrenal cortical substance may exert some regulatory control of the vascular bed directly.

Hypotension.—Hypotension constitutes a regular finding in cortical insufficiency. Its significance is not understood.

18. The concept that the adrenal cortex is especially concerned in the control of carbohydrate metabolism is based chiefly on the observation that adrenal cortical extracts were found to have a greater effect on blood sugar in adrenalectomized animals than the amounts of epinephrine these extracts were said to contain, as determined by biologic assay (Britton, S. W., and Silvette, Herbert: Effect of Cortico-Adrenal Extract on Carbohydrate Metabolism in Normal Animals, Am. J. Physiol. **100:** 693 [May] 1932; The Apparent Prepotent Function of the Adrenal Glands, ibid, page 701). However, adequate attention appears not to have been paid to the possible effect of substances such as histamine (Cleghorn, R. A.: Observations on Extracts of Beef Adrenal Cortex and Elasmobranch Interrenal Body; J. Physiol. **75:** 413 [Aug.] 1932) and choline (Eagle, E.: Presence and Significance of Choline in Cortico-Adrenal Extract, Proc. Soc. Exper. Biol. & Med. **30:** 1094 [May] 1933) which have been found in cortical extracts prepared by the Swingle-Pfiffner method (which was the method employed by Britton and Silvette). These contaminants would render impossible accurate biologic assay of epinephrine. In addition, some of the observations appear to have been made on animals under the influence of ether or of amytal, either of which may affect the blood sugar level. The rôle of the adrenal cortex in the regulation of carbohydrate metabolism therefore remains undecided, as Dr. Loeb has indicated.—ED.

19. Britton, S. W.; Geiling, E. M. K., and Calvary, H. O.: Medullo-adrenal Secretion and Carbohydrate Metabolism, Am. J. Physiol. **84:** 141 (Feb.) 1928. Harrop, G. A., and Weinstein, Albert: Studies on the Adrenal Cortex: I. Cortical Suprarenal Insufficiency and the Action of Cortical Hormone upon the Normal and Suprarenalectomized Dog, J. Exper. Med. **57:** 305 (Feb.) 1933.

20. This subject is discussed further in the papers in this series by Rogoff (The Adrenal Medulla) and by Best (The Internal Secretion of the Pancreas).—ED.

21. The thesis of Swingle and his collaborators as to the rôle of the adrenal cortical hormone in circulatory shock has been further criticized on several grounds by Freeman (Science **77:** 211 [Feb. 24] 1933), Britton and Silvette (Science **77:** 366 [April 14] 1933; footnote 12) and J. McKeen Cattell (Science **77:** 428 [May 5] 1933).—ED.

Pigmentation.—The characteristic pigmentation of the skin and mucous membranes as it occurs in Addison's disease is not encountered in animals adequately treated with cortical extract or in a chronic state of adrenal insufficiency.

In a number of clinical reports on the effect of cortical extract in Addison's disease, it has been stated that the patients become lighter after treatment. This is true. However, in some of the cases observed the change appears to be due not to pigment loss but to rehydration of the tissue spaces with stretching of the skin. This idea receives support from the observation that within from two to five days following salt withdrawal in patients with Addison's disease, pigmentation appears intensified as acute adrenal insufficiency is induced. With the ingestion of salt, and improvement, pigmentation apparently becomes less intense. It is most unlikely that these rapid changes are dependent on deposition and solution of pigment.

Gastro-Intestinal Disturbances.—Patients with "compensated" Addison's disease frequently have a hypochlorhydria, their appetites are capricious and they vomit with apparently very little cause. In adrenalectomized dogs and cats, bloody diarrhea may develop in the course of a few days after the withdrawal of cortical extract. However, there is nothing which need be considered specific of disturbed adrenal physiology in the anorexia, nausea and vomiting occurring in the collapse of severe adrenal insufficiency. The mechanism of these disturbances is not understood.

Neurologic Disturbances.—Patients in severe adrenal insufficiency frequently show general or focal neurologic disorders including disorientation, confusion, aphasia, convulsions and reflex changes. In untreated adrenalectomized animals, spasticity and weakness of the hind legs are common and convulsions also occur. These disorders may at times be associated with hypoglycemic shock. This, as has been intimated, may be referable to medullary insufficiency with the consequent loss of insulin antagonism. On the other hand, neurologic abnormalities may appear in the absence of severe hypoglycemia. These may result from decreased cerebral circulation, a part of the more general picture of dehydration and shock. There is no direct proof for the idea that changes in the central nervous system result from failure of any normal action of cortical substance on brain cells.

Immune Reactions.—Much has been written concerning the rôle of the adrenal glands in immune reactions.[22] The susceptibility of adrenalectomized animals to various bacterial toxins and to infections is among the aspects of the problem studied. The consensus suggests increased susceptibility to infection and intoxication in adrenal insufficiency. The chief difficulty in evaluating results obtained from this type of study seems to be in the fact that the subjects for investigation are sick animals, and, therefore, the specificity of adrenal deficiency becomes doubtful. Clinical observation of patients with Addison's disease does not indicate any particular susceptibility to infectious disease. When infection develops in one of these patients, however, the severity of adrenal insufficiency is augmented.

Effects of Other Endocrine Glands.—A study of the effect of cortical insufficiency on other endocrine functions in animals is difficult because prolonged severe insufficiency is incompatible with life.[22a] It has already been indicated that up to the present time it has been found impossible to produce any detectable changes in in the normal animal by the injection of cortical extract. Nature has, however, produced one experiment in which the products of the adrenal cortex appear to induce certain other endocrine disturbances. With certain tumors of the adrenal gland, hirsutism and amenorrhea develop with regularity; the relationship of these phenomena to basophilic adenoma of the pituitary has been discussed in the first paper in this series, by Evans.

Hartman [23] has recently reported evidence for the presence of a second hormone in the adrenal cortex, "cortilactin"; this he considers to be absent from certain cortical extracts and to be essential for lactation in the adrenalectomized animal. Further investigation will be necessary to confirm these results.[24]

As already indicated, until the cortical hormone or hormones are definitely available in sufficient quantities in crystalline form, the endocrinologic relationships as well as the other functions of the adrenal cortex will remain in a state of confusion.

THERAPEUTIC APPLICATION OF THE CORTICAL HORMONE

The development of cortical extracts has reached a stage at which it is possible to maintain totally adrenalectomized animals in apparently normal health. In this direction a great advance has been made which is encouraging for the future application to human disease.

Despite the earlier reports [25] concerning the use of cortical extracts in the treatment of Addison's disease, the ultimate goal has not been reached. On the basis of animal experimentation this failure in many cases appears to be largely dependent on the fact that the commercial preparations available may be too dilute or that they deteriorate; surely they are too costly to be administered in adequate amounts over long periods of time.

It seems certain that the administration of cortical extracts and of sodium chloride has a definitely beneficial effect in the acute crises of Addison's disease. It is also certain that, while salt alone will prolong life, it will not maintain it indefinitely in the adrenalecto-

22. Steinback, M. M.: Experimental Tuberculosis in the Albino Rat: The Comparative Effects of Avitaminosis, Suprarenalectomy and Thyroid-Parathyroidectomy on Experimental Tuberculosis, Am. Rev. Tuberc. **26:** 52 (July) 1932. Khorazo, D.: Agglutinin Production in Suprarenalectomized Rats, J. Immunol. **21:** 151 (Aug.) 1931. Perla, D., and Marmorston-Gottesman, J.: Immunological Studies in Relation to the Suprarenal Gland: IV. The Effect of Repeated Injections of Epinephrine on the Haemolysin Formation in Suprarenalectomized Rats, J. Exper. Med. **50:** 87 (July) 1929. Ecker, E. E., and Rogoff, J. M.: Susceptibility of Albino Rats to Tetanus Toxin Following Adrenalectomy, Am. J. Physiol. **80:** 200 (March) 1927.

22a. However, chronic and subacute adrenal insufficiency may be produced in animals by subtotal ligation of the adrenals, as Rogoff has demonstrated (Proc. Soc. Exper. Biol. & Med. **29:** 1240 [June] 1932). Animals with chronic insufficiency have been found to survive up to 14 months. The histologic changes in the adrenals characteristic of Addison's disease have been reproduced in all gradations; in some cases infection was superposed on the ischemic glands. Thus, a method is available for studying the effects of prolonged adrenal insufficiency, both medullary and cortical.—ED.

23. Brownell, K. A.; Lockwood, J. E., and Hartman, F. A.: A Lactation Hormone of the Adrenal Cortex, Proc. Soc. Exper. Biol. & Med. **30:** 783 (March) 1933.

24. Recent investigators have suggested the presence of still other special hormones in the adrenal cortex. This is based on the finding that certain products (crystalline and noncrystalline) obtained from cortical extracts appear to have special effects in adrenalectomized animals apart from the life-sustaining property.[7] However, the present evidence is so conflicting and confusing that judgment must be reserved for the present.—ED.

25. Rogoff, J. M., and Stewart, G. N.: Suprarenal Cortical Extracts in Suprarenal Insufficiency (Addison's Disease), J. A. M. A. **92:** 1569 (May 11) 1929. Rowntree, L. G.; Greene, C. H.; Ball, R. G.; Swingle, W. W., and Pfiffner, J. J.: Treatment of Addison's Disease with the Cortical Hormone of the Suprarenal Gland, J. A. M. A. **97:** 1446 (Nov. 14) 1931. Rogoff, J. M.: Addison's Disease: Further Report on Treatment with "Interrenalin," J. A. M. A. **99:** 1309 (Oct. 15) 1932. See also footnote 1.

mized animal. A certain amount of cortical extract is essential. Hence it would seem logical that even small doses of cortical extract would be better than none. Nevertheless, in my limited experience, it has been impossible to demonstrate objective effects (on blood urea and blood sodium) of a commercial preparation of cortical extract given in daily doses up to 10 cc. Also, 25 cc. given in one day in addition to salt and dextrose has failed to check progressive adrenal insufficiency. Whether the apparent effect on appetite and sense of well being is more than psychologic is uncertain. It is highly improbable, however, that doses of from 2 to 3 cc. given two or three times a week have any significant physiologic effect. The recent studies of Rogoff [26] support this idea.

There is at the present time a tendency toward the widespread and indiscriminate administration of cortical extract in small and infrequent doses to all those who are "weary and heavy laden." While this type of therapy may or may not be harmless, it is neither specific nor critically applied.

DIPHTHERIA MORTALITY IN LARGE CITIES OF THE UNITED STATES IN 1934

TWELFTH ANNUAL REPORT

This report concerns the ninety-three cities dealt with in the recent article on typhoid,[1] and the rates are calculated on the basis of the population figures used in that article. The number of diphtheria deaths in each city has been reported to us by the respective health departments.[2] Particulars as to the years that are included in the five year averages annotated as "incomplete data" are given in footnotes to tables 1-8 in our previous reports through the one covering 1931 and are itemized at the beginning of the article for 1932.

In the New England cities (table 1) diphtheria continues to decline. In 1934 these fourteen cities had only forty-four deaths from diphtheria, as against seventy in 1933 and ninety-six in 1932. Cambridge, New Bedford, New Haven and Springfield completed the year without a single diphtheria death, and Hartford, Providence and Worcester state that the only deaths were in nonresidents. New Bedford's clear record comes after several years of rather high diphtheria mortality. Boston has the lowest rate in its history (1.1). Waterbury, after its sudden rise in 1933, had a low rate again in 1934, while Lynn and Somerville, after improvement for three years, had setbacks. Lowell's excessive diphtheria mortality of 1932 and 1933 continued in 1934, its rate having been progressively higher each of these three years. Lowell's rate was the highest in the country in 1934 (15.0); it had been one of the ten highest also in 1932 and 1933. Somerville's 1934 rate (6.6) is also one of the ten highest (table 11). Lowell and Somerville are among the ten cities with highest 1930-1934 averages (table 10). Considering the recent five-year period the

TABLE 1.—*Death Rates of Fourteen Cities in New England States from Diphtheria (Including Croup) per Hundred Thousand of Population*

	1930-1934	1934	1933	1925-1929	1920-1924	1915-1919	1910-1914	1905-1909	1900-1904	1895-1899	1890-1894
New Haven	0.5	0.0	0.6	1.6	7.1	14.2	14.9	22.7	15.6	54.8	74.5
Bridgeport	1.0	0.7	0.7	11.8	19.6	23.4	23.3	26.8	34.2	63.9	79.3
Hartford	1.1	0.6*	0.0	5.3	11.9	13.8	25.3	28.1	38.8	47.8	120.9
Cambridge	1.2	0.0	1.7	3.2	8.9	12.9	23.8	25.3	46.7	71.9	58.0
Springfield	2.1	0.0	0.0	10.3	15.4	24.9	19.1	31.3	29.6	51.3	68.2
Waterbury	2.4	1.0	5.9	2.6	17.9	23.0	29.6	....	....	....	....
Worcester	2.9	1.0*	2.0	8.6	15.5	14.1	21.3	32.2	16.5	50.3	47.8
Boston	3.2	1.1†	3.3	8.3	20.2	26.3	20.0	26.2	53.7	83.9	112.2
Fall River	3.9	1.7†‡	4.4	12.0	25.5	23.6	24.0	34.4	50.1	43.8	46.9
Lynn	4.7	4.9	1.0	13.5	17.0	17.8	17.2	21.7	38.0	44.0	49.0
New Bedford	4.8	0.0‡	5.4	10.9	16.5	17.0	20.9	22.6	25.1	53.6	20.0
Providence	5.0	0.4*	1.2	9.5	15.8	29.3	26.8	30.7	41.2	53.5	55.3
Somerville	9.0	6.6	2.8	5.7	19.7	20.2	21.4	21.5	40.5	57.8	37.4
Lowell	9.4	15.0‡	12.0	10.6	16.7	23.5	20.6	31.0	59.3	44.3	36.4

* All of the diphtheria deaths reported were stated to be in nonresidents.

† One third or more of the reported diphtheria deaths were stated to be in nonresidents.

‡ Rate computed from population as of April 1, 1930, as no estimate for July 1, 1933, was made by the Census Bureau.

improvement in diphtheria in the New England cities is striking (table 16). The group average for 1930-1934 is less than half of that for 1925-1929 (3.38 as compared with 8.34). Thirteen of the fourteen cities (Somerville being the exception, which seems to have had an epidemic in 1930) had lower averages for 1930-1934 than for the preceding quinquennium. In Waterbury the decrease is slight, and the New Haven average remains low (one of the lowest in the country—

TABLE 2.—*Death Rates of Eighteen Cities in Middle Atlantic States from Diphtheria (Including Croup) per Hundred Thousand of Population*

	1930-1934	1934	1933	1925-1929	1920-1924	1915-1919	1910-1914	1905-1909	1900-1904	1895-1899	1890-1894
Syracuse	0.4	0.0	0.0	2.0	22.9	12.9	16.6	17.4	17.7	31.1	55.4
Yonkers	0.6	0.7	0.0	10.4	17.0	17.7	25.3	....	....	....	....
Rochester	0.7	0.3	0.0	7.5	16.9	12.7	22.1	32.4	52.3	45.9	96.6
Utica	1.2	0.0	1.9	13.4#	....	....	....	....	....	....	....
Philadelphia	1.3	1.1	0.7	11.8	16.7	22.7	24.6	34.1	50.0	100.6	119.4
Scranton	1.3	1.4†¶	0.7	11.7	12.3	22.1	23.4	....	....	77.8‖	48.6‖
New York	2.2	1.4	1.2	10.7	14.0	21.8	28.0	40.0	58.0	85.8	134.4
Trenton	2.7	0.8	0.8	4.4	7.3	8.8	12.3	15.8	23.6	92.7‖	89.7‖
Albany	2.9	3.8†	3.1	7.5	12.8	10.4	20.0	31.6	26.9	....	....
Newark	3.0	0.2	0.2	14.5	9.7	14.6	23.3	30.1	46.7	79.1	110.4
Erie	3.5	2.5	2.5	5.8	16.8	15.1	17.7	27.1	42.3	23.1	....
Reading	3.8	5.4	6.2	7.3	21.1	16.9	35.7	29.2	70.1	72.0	94.1
Elizabeth	4.5	0.0	0.0	13.2	19.2	19.3	14.8	51.7	42.4	60.5	79.3
Buffalo	4.8	1.0	4.8	9.1	24.0	27.3	22.0	18.4	24.8	53.5	60.9
Pittsburgh	5.0	5.4	2.9	11.5	20.1	22.3	29.3	20.4	36.9	52.9	86.4
Jersey City	6.0	3.4	2.5	11.5	18.4	21.0	23.2	32.6	57.9	85.4	108.6
Paterson	6.3	4.3†	8.6	9.1	18.5	13.5	16.1	25.5	52.9	111.8	145.4
Camden	7.7	5.0	5.9	21.9	20.3	23.2	38.8	48.9	52.6	93.8	194.0

† One third or more of the reported diphtheria deaths were stated to be in nonresidents.

‖ Diphtheria deaths from Chapin's Municipal Sanitation.

Incomplete data.

¶ Diphtheria deaths for Scranton furnished by Pennsylvania Department of Health, Harrisburg.

table 10), while the Lowell average remains high. But in all the other cities the decrease between the two five-year averages is conspicuous, particularly for the four cities that were at the foot of the list for 1925-1929: the two rates for Bridgeport are 11.8 and 1.0, for Lynn 13.5 and 4.7, for Springfield 10.3 and 2.1, and for Fall River 12.0 and 3.9.

The cities of the Middle Atlantic states (table 2) had a slight increase in diphtheria mortality in 1934

26. Rogoff, J. M.: The Adrenal Cortical Hormone: Experiments with a Commercial Adrenal Extract (Eschatin), J. A. M. A. **103:** 1764 (Dec. 8) 1934.

The preceding articles were published in THE JOURNAL, Sept. 20, 1924, p. 918; April 25, 1925, p. 1269; April 3, 1926, p. 1005; April 30, 1927, p. 1396; May 19, 1928, p. 1621; May 25, 1929, p. 759; June 7, 1930, p. 1838; May 23, 1931, p. 1768; May 7, 1932, p. 1644; May 20, 1933, p. 1595, and May 26, 1934, p. 1758.

1. Typhoid in the Large Cities of the United States in 1934, J. A. M. A. **104:** 2093 (June 8) 1935.

2. It should be noted that the figures include all deaths of diphtheria that have occurred within the city limits, of nonresidents as well as residents. In some instances this undoubtedly gives an exaggerated impression of the amount of diphtheria in a community, but at present statisticians are agreed that "the attempt to eliminate the deaths of nonresidents would often result in an understatement of the true mortality" (Bureau of the Census, Mortality Statistics, 1912, p. 13). Cities in which one third or more of the reported diphtheria deaths are stated to have occurred in nonresidents are indicated in tables 1-8. In 1934 there were twenty-five such cities, in six of which there were no resident diphtheria deaths. A further discussion of the problem of the nonresident in diphtheria statistics was given in the report covering the year 1931.

as compared with 1933, with 211 deaths as against 192 (table 16). Even so, its group rate is the lowest in the country (1.63). Eight of the eighteen cities had higher rates in 1934 than in 1933, but no striking increase appears, unless perhaps in Pittsburgh, where the rate is almost double that of the preceding year. Paterson, on the other hand, halved its 1933 rate in

TABLE 3.—*Death Rates of Nine Cities in South Atlantic States from Diphtheria (Including Croup) per Hundred Thousand of Population*

	1930-1934	1934	1933	1925-1929	1920-1924	1915-1919	1910-1914	1905-1909	1900-1904	1895-1899	1890-1894
Baltimore	1.7	0.8	0.7	7.6	11.4	13.5	14.2	16.1	33.0	68.1	70.0
Richmond	3.6	1.6†	4.3	6.9	9.8	5.8	7.0	9.8	24.4	17.6	59.7
Miami	3.8	4.6	2.7	5.4#	....	....	....	....	....	....	....
Washington	3.9	3.2†	2.2	7.1	10.5	11.9	6.9	11.2	23.5	50.9	77.9
Norfolk	4.6	2.3‡	2.3	4.1	4.3	4.1	6.7	17.0	....	....	....
Tampa	4.8	2.8†	4.6	4.6	5.2	9.5#	....	....	....	....	....
Wilmington	5.3	1.9‡	5.6	10.9	11.6	15.2	18.0	27.8	50.9	84.9	83.8
Jacksonville	5.4	7.2	5.0	6.0#	....	....	....	....	....	....	....
Atlanta	5.7	7.5†	12.0	7.0	13.3	10.1	12.5	14.2	11.1	10.5	8.8

† One third or more of the reported diphtheria deaths were stated to be in nonresidents.
‡ Rate computed from population as of April 1, 1930, as no estimate for July 1, 1933, was made by the Census Bureau.
# Incomplete data.

TABLE 4.—*Death Rates of Eighteen Cities in East North Central States from Diphtheria (Including Croup) per Hundred Thousand of Population*

	1930-1934	1934	1933	1925-1929	1920-1924	1915-1919	1910-1914	1905-1909	1900-1904	1895-1899	1890-1894
Grand Rapids	0.3	0.0	1.1	2.0	19.6	13.5	20.0	26.6	17.2	32.4	99.2
South Bend	1.3	0.0	0.0	....	....	....	....	....	....	....	....
Canton	1.7	0.0	1.8	2.9	17.5	15.1#	....	....	....	....	....
Milwaukee	2.0	1.5†	0.8	8.5	11.4	19.8	27.8	26.4	22.7	51.7	116.2
Cleveland	2.5	3.0	2.6	15.3	14.7	20.0	24.6	20.8	42.6	45.3	95.7
Akron	2.7	5.3	1.9	4.9	10.4	18.9	27.8	21.8#	....	....	....
Flint	2.7	2.4	5.3	4.5	29.9	25.5	12.7	11.0	16.8	6.9	69.2
Toledo	2.8	2.0†	3.0	7.2	22.4	14.1	25.4	20.4	56.8	34.6	89.3
Indianapolis	3.1	3.8	4.0	6.6	11.7	21.4	13.5	13.3	15.9	36.4‖	97.3#
Cincinnati	3.2	5.4	3.0	5.2	10.6	13.2	13.9	17.0	17.3	37.3	103.7
Columbus	3.2	4.0	1.3	4.6	8.5	7.6	12.1	10.5	11.6	28.5	56.9
Evansville	3.2	3.8	4.7	3.7	13.9	14.9	16.1	21.2	13.8	18.1	69.7
Fort Wayne	3.3	2.5	3.3	5.1	13.1	6.3	....	....	....	....	....
Youngstown	3.3	0.6*	0.6	10.5	18.5	11.9	40.5	33.5	28.0	17.6	28.4#
Dayton	3.5	3.4	3.8	4.6	9.4	9.3	22.1	13.3	17.2	27.4	82.9
Chicago	4.3	1.2	0.2	11.7	17.5	31.2	37.9	27.0	33.9	69.7	117.3
Detroit	4.8	0.7	3.0	19.7	24.3	32.2	33.3	22.6	38.5	62.9	132.9
Peoria	5.3	2.7	3.6	4.9	7.4	10.8	10.6	10.9#	14.0	14.6	68.0

* All of the diphtheria deaths reported were stated to be in nonresidents.
† One third or more of the reported diphtheria deaths were stated to be in nonresidents.
‖ Diphtheria deaths from Chapin's Municipal Sanitation.
Incomplete data.

1934. Despite the 1934 increase in this group of cities, the five-year averages tell a very cheerful story. Every single city has decidedly decreased its average annual rate in the past five-year period as compared with 1925-1929. While Camden is still at the foot of the list, as it was five years ago, and still has one of the ten highest five-year averages in the country (table 9), its 1930-1934 rate is 7.7, as compared with a 1925-1929 average of 21.9. Newark's rate declines from 14.5 to 3.0, Philadelphia's from 11.8 to 1.3, and Scranton's from 11.7 to 1.3. Syracuse, Yonkers and Rochester have among the ten lowest averages in the country (table 10). The group average for 1930-1934 is about a quarter of the corresponding rate for 1925-1929 (2.50 as against 9.97). The Middle Atlantic group had the next to the highest rate in the country for 1925-1929; for 1930-1934 it has the lowest. Moreover, this lowest group rate for 1930-1934 is only 40 per cent of the lowest rate for 1925-1929 (the Mountain and Pacific rate of 6.28).

The recent five-year average of the cities in the South Atlantic states (table 3) is less than half of their average for 1925-1929 (3.54 and 7.37), and the five-year averages for seven of the nine cities in the group are likewise lower. The increases for Norfolk and Tampa are slight. Atlanta and Jacksonville, despite lowering their averages, had among the ten highest such rates in the country (table 11). The greatest improvement occurred in Baltimore, where the average declined from 7.6 to 1.7, and in Wilmington (from 10.9 to 5.3). Baltimore had the next to the worst rate in the group for 1925-1929, but its 1930-1934 rate not only leads the group but is one of the best rates among the thirteen cities in the country with more than 500,000 population, San Francisco (1.2) and Philadelphia (1.3) alone having better averages. For the year 1934 for the first time the group rate is below 3.0. Four cities had somewhat higher rates in 1934 than in the previous year; but Wilmington and Atlanta decidedly lowered their rates as compared with 1933, when the diphtheria mortality in both cities seems to have made a sudden rise.

The East North Central cities (table 4) had slightly more diphtheria mortality (eleven more deaths) in 1934 than in 1933, but no important change in rate in any of the individual cities. South Bend had its third successive year without a diphtheria death—a new record among American cities—and also the second-best five-year average in the group. We have no data for South Bend prior to 1930 with which to compare this average. All the other cities except Peoria had

TABLE 5.—*Death Rates of Six Cities in East South Central States from Diphtheria (Including Croup) per Hundred Thousand of Population*

	1930-1934	1934	1933	1925-1929	1920-1924	1915-1919	1910-1914	1905-1909	1900-1904	1895-1899	1890-1894
Birmingham	4.2	2.9	2.9	5.4	5.3	7.2	8.3	6.2	13.4	16.5	26.3
Memphis	6.0	2.3†	4.5	5.8	9.5	11.2	11.9	13.4	6.9	10.0	28.5
Louisville	6.3	11.3	11.0	4.6	10.4	9.5	9.0	....	....	39.0‖	49.6‖#
Chattanooga	6.8	9.7¶	8.0	5.9	8.7	8.9	...	....	....	....	....
Nashville	8.2	8.3†	7.6	11.8	8.0	8.9	7.3	10.3	13.9	30.1	28.4
Knoxville	9.6	10.8	8.0	6.3	11.2	...	...	....	....	....	....

† One third or more of the reported diphtheria deaths were stated to be in nonresidents.
‖ Diphtheria deaths from Chapin's Municipal Sanitation.
Incomplete data.
¶ Diphtheria deaths for Chattanooga furnished by the Tennessee Department of Health, Nashville.

TABLE 6.—*Death Rates of Nine Cities in West North Central States from Diphtheria (Including Croup) per Hundred Thousand of Population*

	1930-1934	1934	1933	1925-1929	1920-1924	1915-1919	1910-1914	1905-1909	1900-1904	1895-1899	1890-1894
Duluth	0.4	0.0	0.0	2.0	6.0	10.2	8.8	38.2	29.1	7.6	49.5
St. Paul	1.1	0.7	1.1	5.2	17.5	20.7	31.4	31.1	27.9	43.3	75.4
Minneapolis	1.7	1.0	1.4	11.9	13.4	19.9	28.3	24.4	44.6	34.0	55.0
Kansas City, Mo.	3.2	2.2†	2.6	4.7	14.4	22.8	15.7#	....	....	....	....
Kansas City, Kan.	3.7	4.9	2.4	4.6	9.8	23.1	12.4#	....	....	....	....
Des Moines	4.3	4.8	5.5	5.2	15.1	16.6	15.1	23.8#	....	....	....
St. Louis	4.3	4.6	3.7	10.3	16.1	24.4	23.7	19.4	43.3	62.9	67.7
Wichita	4.6	2.5	2.5	4.2	....	....	....	....	....	....	....
Omaha	4.7	2.7†	0.9	6.4	22.9	35.8	15.8	24.5	20.5	28.2	82.9

† One third or more of the reported diphtheria deaths were stated to be in nonresidents.
# Incomplete data.

lower averages for 1930-1934 than for the preceding quinquennium, remarkable reductions having occurred in the five cities that had the poorest 1925-1929 rates: Detroit (from 19.7 to 4.8), Cleveland (from 15.3 to 2.5), Chicago (from 11.7 to 4.3), Youngstown (from 10.5 to 3.3) and Milwaukee (from 8.5 to 2.0). The average for the group as a whole for 1930-1934 is less than one-third that for 1925-1929 (3.66 as compared with 11.21).

The cities of the East South Central states (table 5) are the only group in the country which does not show a brilliant lowering of rate in a comparison of the averages for 1925-1929 and 1930-1934. For this group the two averages are almost identical (6.34 and 6.36). Whereas their rate for 1925-1929 was the second best in the country (and practically the same as the best, which was 6.28, for the Mountain and Pacific group), their rate for 1930-1934 is the next to the worst (and virtually the same as the worst, which is 6.55, for the West South Central group). Four of the six cities have higher averages for 1930-1934 than for the preceding period, the largest increase being that for Knoxville (from 6.3 to 9.6), a city that has had one of the ten highest rates in the country for every year beginning with 1931. Birmingham and Nashville have lowered their averages, but still Nashville appears with Knoxville and Chattanooga among the cities with the ten highest (1930-1934) averages (table 9). Comparing the 1934 rates with those for 1933, we find a slight increase in the group rate (7.00), which is the highest in the country, as it was also in 1933 (6.84). Birmingham and Memphis are the only members of the group in which the 1934 rates are not higher than those for 1933. The other four cities had high rates in 1933 and higher in 1934 and hold second, third, fifth and sixth places on the list of ten cities with the highest 1934 rates in the country (table 11).

The cities of the West North Central states (table 6) had a few more diphtheria deaths in 1934 than in 1933, and three of the nine cities had higher rates. Duluth, however, had its second successive year without a diphtheria death, the fourth such year in its history. In five-year averages, Wichita is the only city in the group which did not have a lower rate for 1930-1934 than for the preceding period. The improvement is most conspicuous in Minneapolis, which had the highest 1925-1929 average in the group (11.9), double that of its twin city, St. Paul; the 1930-1934 rate for Minneapolis (1.7) is exactly one-seventh its preceding average and only a trifle higher than the corresponding rate for St. Paul. St. Louis has likewise shown great improvement, its 1930-1934 average being 4.3 as compared with a 1925-1929 average of 10.3. Duluth, for both periods, has one of the best national records (rates of 2.0 and 0.4, table 10). The group rate for the past five years is less than half of the rate for the preceding period and is the third best in the country.

The West South Central cities (table 7) considerably bettered their five-year average in 1930-1934, reducing it from 9.24 to 6.55; but this was a modest improvement compared with the halving and quartering done by six of the other groups, and the West South Central rate for 1930-1934 is the highest group rate in the country. El Paso is the only city in the group with a higher average for 1930-1934 than for 1925-1929, although the two averages for Dallas are practically the same (9.7 and 9.8). For the year 1934 there were 26 fewer diphtheria deaths in this group than in 1933, and notably lower rates are found for Fort Worth, Dallas and San Antonio. Three of the eight cities reported increased rates for 1934, the largest increase being for New Orleans (from 2.7 to 6.8). El Paso and New Orleans have among the ten highest 1934 rates in the country (table 11), and Dallas, El Paso, Fort Worth and Tulsa appear on the list of the ten cities with the highest 1930-1934 averages (table 9).

Four of the Mountain and Pacific cities (table 8) report no diphtheria deaths in 1934. For Salt Lake City, Seattle and Spokane this means two successive years without a death from diphtheria, while Long Beach had only one death (and that in a nonresident) during the same period. San Francisco and Tacoma had only one diphtheria death each in 1934, in both instances in a nonresident. Seven of the eleven cities have 1934 rates below 1.0. Oakland and Denver are the only cities in the group showing an increase in 1934 as compared with 1933. The 1934 group rate is lower than the rate for 1933 (1.74 and 1.99). The group rate for 1930-1934 is less than half of the correspond-

TABLE 7.—*Death Rates of Eight Cities in West South Central States from Diphtheria (Including Croup) per Hundred Thousand of Population*

	1930-1934	1934	1933	1925-1929	1920-1924	1915-1919	1910-1914	1905-1909	1900-1904	1895-1899	1890-1894
New Orleans	5.5	6.8	2.7	8.5	6.5	11.6	19.6	10.2	11.5	17.1	51.3
Houston	5.6	6.3	8.3	8.2	6.4	6.1	7.8	10.5	4.2#	2.4	1.8
San Antonio	5.6	2.0†	6.1	10.3	7.7	8.7	6.7	7.6	17.1	20.6	4.4
Oklahoma City	5.7	4.5	3.9	10.9	...	...	...	...	....	....	....
Tulsa	6.8	3.4	6.0	12.5	8.3#	...	...	...	....	....	....
Fort Worth	7.2	3.5†	9.4	10.8	1.7#	2.6#	2.6	2.8	5.4	....	....
El Paso	8.0	10.4	9.3	7.3	20.0	17.6	29.2	...	....	....	....
Dallas	9.7	6.5	12.0	9.8	8.3	7.4	6.9	8.1	16.9	16.0	21.8

† One third or more of the reported diphtheria deaths were stated to be in nonresidents.
# Incomplete data.

TABLE 8.—*Death Rates of Eleven Cities in Mountain and Pacific States from Diphtheria (Including Croup) per Hundred Thousand of Population*

	1930-1934	1934	1933	1925-1929	1920-1924	1915-1919	1910-1914	1905-1909	1900-1904	1895-1899	1890-1894
Salt Lake City	0.3	0.0	0.0	10.1	12.5	14.5	15.1	34.2	46.0	14.8	56.7#
Seattle	0.4	0.0	0.0	1.4	6.6	5.5	5.2	12.5	13.4#	27.2‖	....
Spokane	0.7	0.0	0.0	7.5	11.3	4.2	7.6	25.8	....	59.5‖	18.1
Long Beach	0.8	0.0	0.6	2.6	10.4#	....	....	....	....	....	....
San Francisco	1.2	0.1*	1.2	4.6	23.0	17.0	9.2	14.4	44.2	21.6	54.8
Portland	1.3	0.6†	1.0	6.4	11.3	6.0	12.3	12.2	20.2	....	....
Oakland	2.0	2.7	0.7	7.4	18.8	8.1	10.3	16.1	29.1	....	....
San Diego	2.9	1.9†	4.9	6.6	12.2	10.5	8.0	5.8	2.4	....	....
Denver	3.9	4.4	2.0	8.9	23.2	6.7	10.2	20.8	29.6	27.3	130.2
Tacoma	3.9	0.9*	0.9	9.3	12.4	7.7#	....	....	....	....	....
Los Angeles	4.8	3.0	3.7	7.0	14.4	7.1	7.5	15.3	25.4	35.8	46.0

* All of the diphtheria deaths reported were stated to be in nonresidents.
† One third or more of the reported diphtheria deaths were stated to be in nonresidents.
‖ Diphtheria deaths from Chapin's Municipal Sanitation.
Incomplete data.

TABLE 9.—*Ten Highest Diphtheria Averages for 1930-1934*

Dallas	9.7	El Paso	8.0
Knoxville	9.6	Camden	7.7
Lowell	9.4	Fort Worth	7.2
Somerville	9.0	Chattanooga	6.8
Nashville	8.2	Tulsa	6.8

TABLE 10.—*Ten Lowest Diphtheria Averages for 1930-1934*

Grand Rapids	0.3	New Haven	0.5
Salt Lake City	0.3	Yonkers	0.6
Duluth	0.4	Rochester	0.7
Seattle	0.4	Spokane	0.7
Syracuse	0.4	Long Beach	0.8

TABLE 11.—*Ten Cities with Highest Diphtheria Death Rates for 1934*

Lowell	15.0	Nashville	8.3
Louisville	11.3	Atlanta	7.5
Knoxville	10.8	Jacksonville	7.2
El Paso	10.4	New Orleans	6.8
Chattanooga	9.7	Somerville	6.6

ing rate for 1925-1929, and the 1930-1934 average for every one of the eleven cities is likewise lower than its preceding five-year rate. A striking reduction is that of Salt Lake City (from 10.1 to 0.3); other notable decreases occurred in Spokane, Tacoma, Portland and Denver. Four of the ten cities with best 1930-1934 averages in the country are found in this group: Salt Lake City, Seattle, Spokane and Long Beach (table 10). The group rate (2.69) for 1930-1934 is a close second to the Middle Atlantic rate (2.50), which is the best in the country.

TABLE 12.—*Fifteen Cities with No Diphtheria Deaths in 1934*

Cambridge	Long Beach	South Bend
Canton	New Bedford	Spokane
Duluth	New Haven	Springfield
Elizabeth	Salt Lake City	Syracuse
Grand Rapids	Seattle	Utica

TABLE 13.—*Cities Showing a Continuous Decline in Diphtheria Death Rates (Five-Year Averages) from 1890 Through 1934* *

Baltimore	Hartford	New York
Cincinnati	Jersey City	Philadelphia

* These are the same cities that were on the corresponding list in 1929, except for Camden. When the rates for Camden for 1925-1929 were recalculated in 1930, on the basis of the 1930 census, the 1925-1929 rate became larger than the one for 1920-1924. Camden, therefore, did not really belong in this list in 1929.

TABLE 14.—*Number of Cities with Various Diphtheria Death Rates*

	No. of Cities	40 and Over	20 and Over	10 and Over	5 and Over	Under 5	0.0
1890-1894	64	52	60	61	62	2	0
1895-1899	66	34	53	63	65	1	0
1900-1904	68	22	46	64	66	2	0
1905-1909	72	3	43	66	71	1	0
1910-1914	79	1	36	63	78	1	0
1915-1919	84	0	25	62	81	3	0
1920-1924	88	0	14	65	86	2	0
1925-1929	92	0	1	22	67	25	0
1930.....	93	0	2	11	32	61	3
1931.....	93	0	0	3	29	64	4
1932.....	93	0	0	5	27	66	5
1933.....	93	0	0	4	21	72	11
1934.....	93	0	0	4	17	76	15
1930-1934	93	0	0	0	24	69	0

To summarize the diphtheria experience of the ninety-three cities during the past five years: The East South Central group (table 5) had a 1930-1934 rate about the same as its rate for 1925-1929 (table 16), while the other seven groups showed remarkable decreases, their 1930-1934 averages being the following fractions of those for the preceding period: 25 per cent (Middle Atlantic), 33 per cent (East North Central), 41 per cent (New England and West North Central), 43 per cent (Mountain and Pacific), 48 per cent (South Atlantic) and 61 per cent (West South Central). Six of the eight geographic divisions had low 1930-1934 averages, ranging from 2.50 for the Middle Atlantic cities to 3.66 for those of the East North Central states; the East South Central and West South Central averages were 6.36 and 6.55 respectively.

All the cities had 1930-1934 averages below 10.0, and sixty-nine had rates below 5.0 (table 14). Ten cities (not counting South Bend, for which data are lacking) had higher rates for 1930-1934 than for 1925-1929, but in only the following three did the amount of increase exceed 1.0: Somerville, Knoxville, Louisville. Of the ten cities with highest 1930-1934 averages (table 9), four were in the West South Central states, three in the East South Central, two in New England and one in the Middle Atlantic group. Whereas the lowest 1925-1929 average was 1.4, there were ten rates for 1930-1934 that were below 1.0 (table 10), occurring in the following groups of cities: four in the Mountain and Pacific group, three in the Middle Atlantic cities and one each in New England, the East North Central and West North Central groups. Five of the ten cities with lowest rates for 1930-1934 were on the corresponding list for 1925-1929 (Duluth, Grand Rapids, New Haven, Seattle and Syracuse).

Apparently the tremendous improvement in diphtheria in the large cities, indicated by the comparison of the 1925-1929 and the 1930-1934 averages, became established before 1934. In any case, for the country as a whole the year 1934 had only forty fewer diphtheria deaths than 1933 (table 15), whereas, beginning with 1928 up through 1933, the annual diminution had ranged from 175 to 911 deaths. In 1934 four of the geographic sections had slightly increased rates and the other four had decreases, the decreases for New England and the West South Central cities being fairly large. Among the ten highest 1934 rates (table 11) are represented two New England cities, two South Atlantic, two West South Central and four East South Central. Of the fifteen cities without a single diphtheria death in 1934, four are in New England, four in the Mountain and Pacific states, three from both the Middle Atlantic and East North Central groups, and one from the West North Central cities. Eight of

TABLE 15.—*Total Diphtheria Death Rates for Eighty-Eight Cities, 1923-1934* *

	Population	Diphtheria Deaths	Diphtheria Death Rate per 100,000 Population
1923.....	31,060,848	4,078†	13.13
1924.....	31,722,841	3,439	10.84
1925.....	32,384,834	3,133	9.67
1926.....	33,046,827	3,106	9.40
1927.....	33,708,820	3,493	10.36
1928.....	34,370,813	3,176	9.24
1929.....	35,032,806	2,738	7.82
1930.....	35,694,802	1,827	5.12
1931.....	36,503,412	1,366	3.74
1932.....	37,084,712	1,191	3.21
1933.....	37,084,712	861	2.32
1934.....	36,777,112	821	2.23‡

* The five following cities are omitted from this summary because data for the full period are not available: Jacksonville, Miami, Oklahoma City, South Bend and Utica.
† Data for Forth Worth lacking.
‡ The rate for the ninety-three cities in 1934 is 2.26 (population 37,437,812, diphtheria deaths 845). The corresponding rates in 1930, 1931, 1932 and 1933 were respectively 5.12, 3.72, 3.25 and 2.33.

TABLE 16.—*Total Diphtheria Death Rates per Hundred Thousand of Population for Ninety-Three Cities According to Geographic Divisions*

	(1933) Population	Diphtheria Deaths		Diphtheria Death Rates			
		1934	1933	1934	1933	1930-1934	1925-1929
New England.....	2,624,805	44	70	1.68	2.66	3.38	8.34
Middle Atlantic.....	12,952,300	211	192	1.63	1.47	2.50	9.97
South Atlantic.....	2,367,307	70	83	2.96	3.49	3.54	7.37*
East North Central..	9,643,100	182	171	1.89	1.75	3.66	11.21†
East South Central..	1,242,600	87	85	7.00	6.84	6.36	6.34
West North Central..	2,704,500	76	68	2.81	2.50	3.22	7.82
West South Central..	1,934,800	106	132	5.48	6.73	6.55	9.24‡
Mountain and Pacific	3,968,400	69	80	1.74	1.99	2.69	6.28

* Lacks data for 1925 for Jacksonville and Miami.
† Lacks data for South Bend.
‡ Lacks data for Oklahoma City for 1925 and 1926.

these fifteen cities also had clear records in 1933; for only four cities was 1934 the first year without a death from diphtheria.

It is striking that the East South Central cities seem to have shared less than the other geographic divisions in the great reduction in diphtheria mortality in the last five years. In this connection it may be mentioned that a recent study [3] of diphtheria mortality in the white and Negro populations in various American cities indicates that Negroes have a lower mortality from diphtheria than does the white population. From the experience of the other groups of cities dealt with in the present article, diphtheria is proving itself amenable to control measures.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT. HOWARD A. CARTER, Secretary.

VICTOR ELECTROSURGICAL MACHINE ACCEPTABLE

Manufacturer: General Electric X-Ray Corporation, Chicago.

This device is recommended for electrosurgery only. It is constructed similarly to the other Victor machines. The spark gaps, transformer, 60 cycle reactance and condensers are of the same construction as in other machines. The construction, the mounting and the insulation are satisfactory. A single switch throws the connections from "scalpel" to "coagulation." The switch mounting is firm.

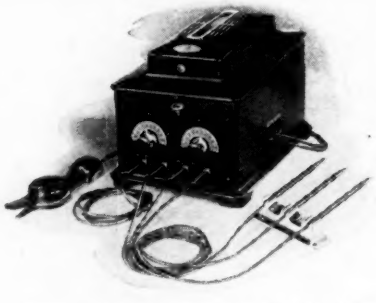


Fig. 1.—Victor Electrosurgical Machine.

At various loads this unit was tested to determine the power, efficiency and frequency. The frequency varies with the variometer setting, staying, however, within a 400 to 1,000 kilocycle per second range. The frequencies are well above neuromuscular response. The efficiency varies from 8 to 30 per cent, depending on the conditions. The high frequency power generated varies from

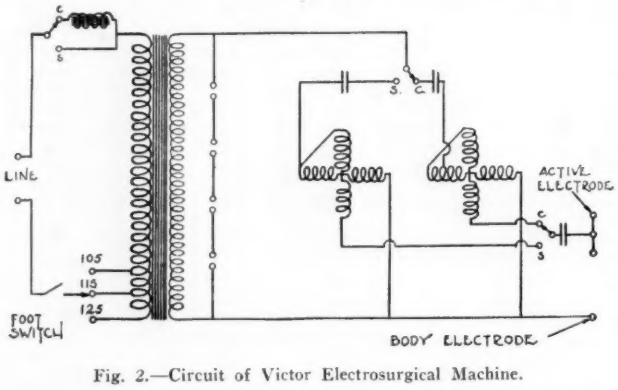


Fig. 2.—Circuit of Victor Electrosurgical Machine.

46 to 177 watts for the "scalpel" connection and from 15 to 90 watts for "coagulation."

In a clinic acceptable to the Council this unit has been tried out under practical conditions in surgery and has been found to come up to expectation.

In view of the foregoing, the Council voted to include the Victor Electrosurgical Machine in its list of acceptable devices.

3. Black, J. B.: Am. J. Hyg. **19**: 734 (May) 1934.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

PAUL NICHOLAS LEECH, Secretary.

DEXTROSE (See New and Nonofficial Remedies, 1935, p. 280):

The several accepted solutions of dextrose and dextrose in physiologic solution of sodium chloride (The Cutter Laboratory), marketed in 1,000 cc. size Saftiflasks, are also supplied in 500 cc. size Saftiflasks.

DEXTROSE (See New and Nonofficial Remedies, 1935, p. 280).

The Cutter Laboratory, Berkeley, Calif.

The following dosage forms have been accepted:

Solution Dextrose U. S. P. 2½% in Physiologic Solution of Sodium Chloride in Saftiflask Container: Each Saftiflask contains 1,000 cc. of a solution containing dextrose, U. S. P., 26.25 Gm. and sodium chloride, 8.5 Gm.

Solution Dextrose U. S. P. 5% in Physiologic Solution of Sodium Chloride in Saftiflask Container: Each Saftiflask contains 1,000 cc. of a solution containing dextrose, U. S. P., 52.5 Gm. and sodium chloride, 8.5 Gm.

Solution Dextrose U. S. P. 10% in Physiologic Solution of Sodium Chloride in Saftiflask Container: Each Saftiflask contains 1,000 cc. of a solution containing dextrose, U. S. P., 105 Gm. and sodium chloride, 8.5 Gm.

Solution Dextrose U. S. P. 20% in Fractionally Distilled Water in Saftiflask Container: Each Saftiflask contains 1,000 cc. of a solution containing dextrose, U. S. P., 210 Gm.

Solution Dextrose U. S. P. 25% in Fractionally Distilled Water in Saftiflask Container: Each Saftiflask contains 1,000 cc. of a solution containing dextrose, U. S. P., 262.5 Gm.

SKIODAN (See New and Nonofficial Remedies, 1935, p. 254).

The following dosage form has been accepted:

Tablets Skiodan, 1 Gm.

PRELIMINARY REPORT OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING PRELIMINARY REPORT. PAUL NICHOLAS LEECH, Secretary.

THIOGLYCEROL SOLUTION 1:50 (ABBOTT)

In this issue of THE JOURNAL there is an article by Dr. Leon E. Sutton on "Thioglycerol—A More Stable Sulphydryl Compound for Use in the Healing of Wounds." At the suggestion of the author, the Abbott Laboratories presented Thioglycerol Solution 1:50 to the Council so that its present status could be reported concurrently with the article.

Thioglycerol Solution 1:50 is one part alpha-mono-thioglycerol ($CH_2OH.CHOH.CH_2SH$) in fifty parts by volume of glycerol.

Dr. Sutton's article is apparently the first additional report on the use of sulphydryl compounds in the healing of wounds since the publication of an article on cysteine hydrochloride (Brunsting, L. A., and Simonsen, Daisy G.: Cutaneous Ulcers Treated by the Sulphydryl Containing Amino Acid Cysteine, THE JOURNAL, Dec. 16, 1933, p. 1937). Subsequently the Council issued a preliminary report on cysteine hydrochloride (THE JOURNAL, March 24, 1934, p. 929), which declared the available evidence insufficient.

It is claimed that thioglycerol is more stable (less readily changed chemically and hence less readily rendered inactive) than its predecessors: thioglucose, which stimulated bacterial growth as well as cell proliferation; thiophenol; thiocresol, which permitted an exuberance of granulation tissue (Reimann, S. P.: Use and Reasons for the Use of Thiocresol to Stimulate Wound Healing, THE JOURNAL, May 3, 1930, p. 1369), and cysteine hydrochloride. Thioglycerol Solution 1:50 has a hydrogen sulphide odor, which is avoided with cysteine hydrochloride, but retains an advantage over thiocresol in that it counteracts the formation of excessive granulation tissue.

One part of Thioglycerol Solution 1 : 50 diluted with 100 parts by volume of glycerin U. S. P. or an aqueous glycerin solution containing 70 per cent glycerin or water is submitted for use in the treatment of sluggish wounds such as those due to burns and in bed sores and other slow healing wounds. This product is definitely contraindicated by the nature of its action in any wound in which there is possibility of neoplasm. Dr. Sutton reports satisfactory healing in all but sixteen of 208 cases treated. Thioglycerol has replaced cysteine hydrochloride at the clinic reporting most of the work with the latter product.

In the opinion of the Council, further studies should be made on the stability of thioglycerol under usual ordinary pharmaceutic and clinical conditions; further investigations are also needed to determine more accurately its scope of usefulness and its stimulating action of epithelial proliferation while inhibiting excessive granulations. The Council, therefore, decided to postpone further consideration of Thioglycerol Solution 1 : 50 until this additional evidence becomes available.

Committee on Foods

ACCEPTED FOODS

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED BY THE COMMITTEE ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOLLOWING ANY NECESSARY CORRECTIONS OF THE LABELS AND ADVERTISING TO CONFORM TO THE RULES AND REGULATIONS. THESE PRODUCTS ARE APPROVED FOR ADVERTISING IN THE PUBLICATIONS OF THE AMERICAN MEDICAL ASSOCIATION, AND FOR GENERAL PROMULGATION TO THE PUBLIC. THEY WILL BE INCLUDED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED BY THE AMERICAN MEDICAL ASSOCIATION.

RAYMOND HERTWIG, Secretary.

TREESWEET PURE CALIFORNIA ORANGE JUICE

Manufacturer.—TreeSweet Products Company, Los Angeles.

Description.—Heated California Valencia orange juice practically equivalent to fresh orange juice in vitamin C content.

Manufacture.—Selected tree ripened fruit, from orchards not sprayed with arsenical sprays, is washed between brushes, dried, inspected, automatically cut in halves and reamed by hand against revolving burrs. The juice is strained, rapidly heated to such temperature as will insure keeping qualities and avoid unnecessary loss of natural flavor, automatically canned while hot, sealed under vacuum, and immediately cooled. Stainless steel tubing is used exclusively throughout the plant.

Analysis (submitted by manufacturer).—

	per cent
Moisture	85.9
Total solids	14.1
Ash	0.4
Fat (ether extract)	0.1
Protein (N × 6.25)	1.1
Reducing sugars as invert sugar	5.6
Sucrose (copper reduction method)	4.8
Crude fiber	0.02
Carbohydrates other than crude fiber (by difference)	11.5
Titratable acidity as citric acid	1.0

Calories.—0.6 per gram; 17 per ounce.

Vitamins.—Biologic tests show that this canned orange juice is equivalent in vitamin C content to freshly extracted orange juice.

Claims of Manufacturer.—Retains practically all the nutritional values of natural orange juice. For all dietary and table uses.

CELLU BARTLETT PEARS PACKED IN WATER WITHOUT ADDED SUGAR OR SALT

Distributor.—The Chicago Dietetic Supply House, Inc., Chicago.

Packer.—Eugene Fruit Growers Association, Eugene, Ore.

Description.—Canned cooked Bartlett pear halves packed in water without added sugar or salt.

Manufacture.—The method of manufacture is essentially the same as for Cellu Juice-Pak Bartlett Pears (THE JOURNAL, Aug. 4, 1934, page 341), with the exception that the fruit is packed in water.

Analysis (submitted by distributor).—

	per cent
Moisture	92.1
Total solids	7.9
Ash	0.2
Fat (ether extract)	0.2
Protein (N × 6.25)	0.3
Reducing sugars as invert sugar	4.3
Sucrose	0.6
Crude fiber	1.1
Carbohydrates other than crude fiber (by difference)	6.1

Calories.—0.3 per gram; 9 per ounce.

Claims of Distributor.—For diets in which sweetened fruit is proscribed.

SUNSHINE BRAND EVAPORATED MILK

Manufacturer.—The Defiance Milk Products Company, Defiance, Ohio.

Description.—Unsweetened, sterilized evaporated milk. The composition and procedure of evaporation and canning are essentially the same as for the usual evaporated milk (THE JOURNAL, April 16, 1932, p. 1376).

CELLU APRICOTS PACKED IN WATER WITHOUT ADDED SUGAR OR SALT

Distributor.—The Chicago Dietetic Supply House, Inc., Chicago.

Packer.—Hunt Brothers Packing Company, San Francisco.

Description.—Canned cooked halved and stoned apricots packed in water without added sugar or salt.

Manufacture.—The method of manufacture is essentially the same as for Cellu Juice-Pak Apricots (THE JOURNAL, Sept. 8, 1934, page 755), with the exception that the fruit is packed in water.

Analysis (submitted by distributor).—

	per cent
Moisture	91.7
Total solids	8.3
Ash	0.3
Fat (ether extract)	0.1
Protein (N × 6.25)	0.6
Reducing sugars as invert sugar	3.0
Sucrose	3.4
Crude fiber	0.3
Carbohydrates other than crude fiber (by difference)	7.0

Calories.—0.3 per gram; 9 per ounce.

Claims of Distributor.—For diets in which sweetened fruit is proscribed.

HEINZ STRAINED CEREAL

Manufacturer.—H. J. Heinz Company, Pittsburgh.

Description.—Strained cooked wheat embryo, farina, cracked whole wheat and rolled oats.

Manufacture.—Equal weights of wheat embryo, wheat middlings (farina), cracked whole wheat and rolled oats are cooked in water at atmospheric pressure, strained in an atmosphere of steam to remove all coarse particles, adjusted to a definite moisture content, vacuumized to remove air, filled into lacquer-lined cans, sealed under "vacuum" and processed.

Analysis (submitted by manufacturer).—

	per cent
Moisture	88.4
Total solids	11.6
Ash	0.3
Fat (ether extraction method)	1.0
Protein (N × 6.25)	2.9
Reducing sugars as invert sugar	0.7
Crude fiber	0.2
Carbohydrates other than crude fiber (by difference)	7.2
Calcium (Ca)	0.01
Phosphorus (P)	0.07
Iron (Fe)	0.0005

Calories.—0.5 per gram; 14 per ounce.

Micro-Organisms.—Bacteriologic and incubation tests show the product to be sterile.

Vitamins.—Vitamin biologic assay shows:

13 Sherman units of vitamin B per ounce
7 Sherman-Bourquin units of vitamin G per ounce

Claims of Manufacturer.—Specially intended for infants, children, convalescents and special diets. Only warming is required for serving.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, JUNE 15, 1935

THE ORIGIN OF SYPHILIS

Still somewhat shrouded in obscurity, the origin of syphilis continues to be of historical and epidemiologic interest. The chief difficulties in securing an adequate solution seem to be inadequate evidence. The favorite theory has been that Columbus's men brought syphilis to Europe from Hispaniola (Haiti). The usual narration affirms that a new disease appeared at the end of the fifteenth century and spread over Europe. The physicians of the period were undecided as to the nature and cause of this extraordinary malady. Some considered it an epidemic disease caused by severe floods, which had occurred in the time of Alexander VI. Others thought that the disease was caused by a malign influence of the stars. Another and more commonly accepted theory, which was based on the accounts of Fallopius, de la Martinière, Jacobus Carpus and Oviedo, states that the disease began at the time when Charles VIII, king of France, invaded Italy. When he attacked Naples, at that time guarded by Spanish troops, the latter were already infected through Columbus's returned voyageurs. The disease then spread to the invading French army. When the latter broke up and scattered, the disease attained epidemic proportions all over Europe.

Among modern historians, Iwan Bloch [1] has been the most important advocate for the American origin of syphilis, even to the extent of naming it the American disease. Previously it had been called the French disease, the disease of Naples, the Spanish pox or the Persian fire. Pusey [2] also is convinced that the preponderance of evidence for the American origin is overwhelming. Both the occidental and the oriental literature of antiquity contain descriptions of local genital diseases, but according to Pusey there seems to be no description of the syphilitic syndrome prior to 1493. The spread of syphilis can be traced in the local chronicles of the time: in 1495 it appeared in France, Germany and Switzerland, in 1496 in Holland and Greece, in 1497 in England and Scotland, and in 1499 in Hungary and Russia. Pusey further cites the entire absence of syphilitic bones of pre-Columbian origin in Europe as conclusive evidence of the absence of syphilis in Europe in pre-Columbian times. Virchow said that there was no reliable evidence of syphilitic bones on the European continent. These have been the most widely accepted views.

However, a minority has held opposed views. Gaston Vorberg [3] maintains that the disease did not appear for the first time in Europe at the end of the fifteenth century but was present in Europe before the discovery of America. He finds the explanations of Diaz de Isla and Oviedo untenable. Their fable as to the American origin appeared twenty-five years after the return from Haiti and appeared at the same time as the use of guaiac as a remedy. As evidence of the existence of pre-Columbian syphilis in Europe he presents a Neolithic humerus and ulna found in the Valley of Petit Morin, which are apparently typical specimens of gummatous osteomyelitis. He further mentions the opinion of Aleš Hrdlička of the Smithsonian Institution, who after examining thousands of bones decided that there was no trustworthy evidence as to the existence of pre-Columbian syphilis in America. He also emphasizes the extreme susceptibility of the native Indians to the syphilitic infection as contracted from their European conquerors. As a significant historical point, Vorberg points out that none of Columbus's contemporary enemies accused him of having introduced the pestilence. Even Diego Alvarez Chanca, the physician on Columbus's second voyage, is silent about it. R. C. Holcomb [4] in a recent study expresses his skepticism as to the American origin of syphilis. He ascribes the sudden interest in syphilis at the end of the fifteenth century to several factors. One important influence was the European development of the art of printing and the consequent dissemination of knowledge. Another factor was the rise of the surgeon in public esteem. In those days the cultured, scholarly physician did not treat wounds and ulcers; these were left to the lowly barber and wound surgeon. Another difficulty was the confused state of ancient dermatology, which was finally evolving some definite disease entities out of the general hodgepodge. This applies particularly to leprosy, which was a broad term covering a multitude of dermatologic misconceptions. Holcomb cites the old surgeon Michael Angelus Blondus (1542), who believed in the great European antiquity of syphilis and identified it with disease described by Celsus and Paul of Aegina. C. S. Butler,[5] in an amusingly vigorous polemic on the question of the American origin of syphilis, accuses Bloch of slurring over many

1. Bloch, Iwan: Der Ursprung der Syphilis, Jena, Fischer, 1901-1911.
2. Pusey, W. A.: The History and Epidemiology of Syphilis, Springfield, Ill., Charles C. Thomas, 1933.
3. Vorberg, Gaston: Ueber den Ursprung der Syphilis, Stuttgart, Puttmann, 1924.
4. Holcomb, R. C.: Christopher Columbus and the American Origin of Syphilis, U. S. Nav. M. Bull. **32**: 401 (Oct.) 1934.
5. Butler, C. S., and Biello, J. A.: The Influence of Ruy Diaz de Isla upon the Question of the Amercian Origin of Syphilis, South. M. J. **26**: 438 (May) 1933.

names of those who wrote concerning it from 1493 and selecting those who favor his views. He further points out that the Romans must necessarily have had syphilis because several of their surgeons, particularly Antyllus, a contemporary of Galen, developed a technic for the cure of aneurysm which held the field until John Hunter's operation was adopted about 1786. Aëtius of Amida in the sixth century A. D. also gave a perfectly good description of aortic aneurysm. Butler has studied Dürer's famous engraving "The First Syphilitic" and emphasizes the importance of the date (1484). He has critically analyzed the book of Ruiz Diaz de Isla and concludes that this author's material has little value in the discussion of the American origin of syphilis. In another recent study, Butler [6] maintains that Aurelius Cornelius Celsus described a type of genital sore that could have meant only the chancre. Though Celsus did not know it was the initial lesion of a constitutional disease, he did know that it was different from another common ulcer of the genitals, which he also describes. Capper [7] declares that the so-called lepers of Biblical times, who were cured in from seven to fourteen days, as well as the lepers of the Middle Ages, were in reality persons with the primary or secondary manifestations of syphilis. He maintains that syphilis among the Romans was described by Celsus, Aretaeus and Aëtius. In these descriptions one recognizes not only chancre and secondary syphilitic lesions but also tertiary manifestations of syphilis, including severe bone pains. Capper believes that syphilis did not exist in America before Columbus's arrival. The epidemic that was raging in Europe following the return of Columbus was due either to some disease or diseases other than syphilis or to syphilis plus the other diseases. Syphilis, however, played a minor part in the ravages resulting from the epidemic.

Another interesting question in the origin of syphilis, which has been neglected, concerns not so much the place as the mode of origin. When the first man came in contact with the first spirochete, a great biologic drama had its origin. Ashmead [8] has called attention to the work of David Forbes of the British Anthropological Society, who wrote that there was a disease of llamas identical with syphilis in man. The bones showed caries, osteitis and periostitis. This disease in llamas was curable by mercurial therapy. Forbes has maintained that syphilis arose in the highlands of Peru among the Indian pack drivers, who were accustomed to unnatural sex relations with llamas. In fact, this unnatural habit was so prevalent in ancient times that a law was evoked which forbade unmarried men to own llamas, and married herdsmen were obliged to bring their wives along. Ancient Peruvian pottery also gives evidence of these bestial practices. Ashmead has suggested that syphilis in the llama might be a variant as is cowpox in the cow. This disease in llamas might profitably be studied by modern investigators, as the question has apparently been forgotten since the contributions of Forbes and of Ashmead.

The available evidence on the origin of syphilis is thus fragmentary and inadequate. The data afforded by the bone remains are doubtful, since these are frequently of uncertain date and have been altered by exposure to erosion. The historical epidemiology of the disease indicates no definite reference to the syphilitic syndrome as such until the last four years of the fifteenth century. This does not necessarily signify that syphilis first appeared in Europe at that time. What it really demonstrates is the important fact that intelligent observers at that time first became aware that there was a disease of venereal origin which began with a local genital lesion and later evolved into a constitutional infection. It seems rational to suppose that the general cutaneous manifestations had passed unrecognized in the general muddle of dermatologic concepts prevalent at the time (leprosy, mentagra, saphati, scabies, gorre). In modern times Ricord distinguished between gonorrhea and syphilis, which up to that time had been frequently considered as various manifestations of the same disease. It would be equally irrational to state that in Ricord's time two venereal diseases had originated. Similarly illogical would be a theory that tuberculosis had its origin at the time Robert Koch discovered the tubercle bacillus, although the disease was vaguely known for centuries as phthisis, the wasting disease, scrofula, and so on. The confusion has been aided considerably by the multiplicity of names given the disease.

6. Butler, C. S.: The Importance of the Chancre on the History of Medicine, U. S. Nav. M. Bull. **32**: 270 (July) 1934.
7. Capper, Aaron: An Epitome of the History of Syphilis, Arch. Dermat. & Syph. **12**: 509 (Oct.) 1926.
8. Ashmead, A. S.: On the Question Whether Pre-Columbian Syphilis in America Originated by Unnatural Practices with Female Llamas, Am. J. Dermat. **13**: 453, 1909.

NONCARDIAC EDEMA

Information concerning the chemical changes associated with the development of edema is being rapidly accumulated. These changes vary with the etiologic factors involved. In the extrarenal edema of nephrosis, for example, which Leiter [1] reviewed a few years ago, several facts seem well established. Leiter summarized these "aphorisms" as follows: 1. All cases of active nephrosis present a significant proteinuria. 2. During the active stage, all cases of nephrotic edema present low total plasma proteins or low plasma albumin, and hence all present low protein osmotic pressure. 3. Nephrotic edema may disappear spontaneously or be absent in spite of albuminuria and low plasma proteins when the albumin-globulin ratio is high enough to give an osmotic pressure of the serum proteins above 20 cm. of water. 4. Nephrotic edema is more likely to yield to various diuretic measures when the plasma albumin is above than when it is below about 2 Gm. per hundred

1. Leiter, Louis: Nephrosis, Medicine **10**: 135 (May) 1931.

cubic centimeters. 5. Nephrotic edema rarely persists any length of time after albuminuria has decreased markedly. 6. The edema fluid in nephrosis, like that in "war edema" and experimental protein depletion, is a low protein filtrate of the plasma . . . not involving the permeability of the capillaries in any way. 7. Low plasma proteins . . . are in themselves capable of accounting for the chronicity of nephrotic edema on a purely mechanical basis. 8. Low plasma proteins and low protein osmotic pressure are certainly not the only factors in nephrotic edema but are probably the most significant.

The experimental edema of proteinemia, whether produced by plasmapheresis or by diet, would seem to present many similarities to the edema of nephrosis. It is therefore especially interesting to examine two recent studies on experimental edema produced in these ways.

Kirk's [2] investigations on dogs were undertaken to reveal the chemical changes accompanying edema formation resulting from lowering the serum proteins, especially the albumin fraction. Plasmapheresis was the method adopted to produce low proteinemia. The dogs were bled at intervals for periods varying from eleven to nineteen days, and the total amounts of blood removed varied from 6,620 to 10,090 cc. By this means a definite low proteinemia was produced in the dogs. Inversion of the albumin-globulin ratio did not occur. The regeneration of the serum globulin occurred at a greater rate than that of the albumin fraction after plasmapheresis was ended. Edema formation was associated with lowered serum protein. Increased blood chlorides occurred simultaneously with decreased gastric chlorides as well as lowered free and total gastric acidity. Studies of the serum p_H revealed no relationship between edema formation and acidosis. It was felt that the primary factor for edema formation is the lowering of the colloidal osmotic pressure of the plasma due to a low proteinemia.

A similar proteinemia in dogs was produced by Weech, Goettsch and Reeves [3] by dietary means. The standard diet used by them results in a progressive decline in the concentration of protein in the serum. A composite curve constructed from the observations on twenty-one animals disclosed a rapid initial fall and a slower subsequent decrease in albumin and total protein and an approximately constant level for globulin, though the latter was subject to wide fluctuations in individual animals.

What, then, are the common denominators of the studies? Loss of protein from the blood, no matter in what way produced, introduces a factor of considerable metabolic importance. This is accompanied by a low protein osmotic pressure, which is probably the principal factor in the development of edema. The relationship of the albumin-globulin fractions is not quite so clear cut and may perhaps be of less significance. The other coexisting chemical changes have also not been shown to be constant enough to play a significant part in this type of edema. The next step should be the investigation of the factors initiating protein loss other than gross dietary deficiencies like that in so-called war edema.

2. Kirk, E. J.: Studies of Edema, Especially the Edema of Renal Origin, Am. J. Clin. Path. **5**: 21 (Jan.) 1935.

3. Weech, A. A.; Goettsch, Elvira, and Reeves, E. B.: Nutritional Edema in the Dog, J. Exper. Med. **61**: 299 (March) 1935.

Current Comment

VITAMIN D CONTENT OF CERTAIN MAMMALIAN LIVERS

Little information has heretofore been available on the vitamin D content of mammalian livers. Devaney and Munsell [1] have recently tested this factor in calf, beef, lamb and hog livers. The line test in rats from 4 to 5 weeks old was used in making the assays. At the end of the three weeks dietary depletion period several individuals of each litter were fed liver. At least one animal was given 0.2 unit of the international standard vitamin D, and one was usually continued on the basal diet alone. Allowance was made for the phosphorus in the liver feedings by adding extra calcium in the form of calcium carbonate to the Steenbock diet in amounts large enough to maintain the calcium : phosphorus ratio of the whole diet equal to that of the rachitic diet alone. The vitamin D potency of each type of liver was estimated by using a curve of reference relating degrees of healing to the number of vitamin D units. The comparison thus available showed that beef and hog liver had between 0.4 and 0.5 international unit of vitamin D per gram, while lamb liver had slightly less than 0.2 unit and calf liver only about 0.1 unit. Mammalian liver is thus shown as a possible significant source of vitamin D in addition to its other qualities. The content is, however, negligible in comparison with more familiar sources of vitamin D such as cod liver oil, which contains 85 units per gram, or 315 units per standard teaspoonful.

MORTALITY IN PEPTIC ULCER

The deaths charged to "ulcer of the stomach" in New York City from 1900 to 1933 forms the subject of a recent comment.[1] The death rate per hundred thousand of population has gone from 3.69 in 1900 to 6.77 in 1933, having reached its peak, 7.51, in 1928. On further examination the surprising fact is disclosed that there has been a definite decline in the death rate among females during this period. A striking change in the ratio between male and female deaths has thus occurred. At the beginning of the century the ratio was nearly 1 : 1; now it is approximately 5 : 1. A further apparent change in the mortality from peptic ulcer has been in the age group at which death occurred. Thus now, in sharp contrast with conditions three decades ago, the death rate in males has become high

1. Devaney, Grace M., and Munsell, Hazel E.: Vitamin D Content of Calf, Beef, Lamb and Hog Liver, J. Home Economics, April, 1935.

1. Some Puzzling Facts on Peptic Ulcer, Quart. Bull. City of New York Department of Health **2**: 84 (No. 4) 1934.

at 40, even though the peak remains later in life. The reasons for the marked increase in mortality among males and the relatively earlier ages of death are uncertain. The answer is probably not to be found in consideration of mortality rates alone but must be sought in more inclusive morbidity studies.

Association News

MEDICAL BROADCASTS

Columbia Broadcasting System

The American Medical Association broadcasts on a western network of the Columbia Broadcasting System each Thursday afternoon on the Educational Forum from 4:30 to 4:45 Chicago daylight saving time (3:30 central standard time). The next two broadcasts will be as follows:

June 20. Burns, W. W. Bauer, M.D.
June 27. Blood and Fire, W. W. Bauer, M.D.

National Broadcasting Company

The American Medical Association broadcasts under the title "Your Health" on a Blue network of the National Broadcasting Company each Tuesday afternoon from 4 to 4:15 Chicago daylight saving time (3 o'clock central standard time). The next two broadcasts will be as follows:

June 18. Only One Pair of Eyes, W. W. Bauer, M.D.
June 25. Speaker and topic to be announced.

Note: After these talks, broadcasts on both networks will be discontinued until further notice.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

ALABAMA

Bill Introduced.—H. 523 proposes to limit the retail distribution of articles, devices, drugs and medicinal preparations which may be used as contraceptives or for the prevention of venereal disease to licensed physicians and registered pharmacists.

CALIFORNIA

Bill Enacted.—A. 603 has been enacted as c. 269, Laws, 1935, amending the law relating to county hospitals so as to require the admittance of any expectant mother, unable to pay for the necessary care, to any county hospital.

State Medical Election.—Dr. Edward M. Pallette, Los Angeles, was chosen president-elect of the California Medical Association at the annual meeting, May 13-16, and Dr. Robert A. Peers, Colfax, was installed as president. Coronado was designated as the place for the next annual meeting.

Society News.—Dr. Hugh Hampton Young, Baltimore, will address the San Francisco County Medical Society, June 28, on "Present Day Surgery of the Prostate."——Dr. Otto A. Houzvicka, San Diego, addressed the San Diego County Medical Society, May 14, on "Infection in the Blood Stream."

Court Sustains Revocation of License.—The district court of appeal of the second appellate district sustained the California Board of Medical Examiners, March 19, in revoking the license of Dr. Eugene J. Rinaldo. The board revoked the license, Oct. 18, 1932, on the charge that Rinaldo had presented fraudulent credentials for state licensure. In 1933 Superior Judge Wilson overruled the board's decision.

Bill Passed.—A. 2441 has passed the Assembly, proposing to prohibit the sale of dinitrophenol or thyroid and compounds, preparations or derivatives thereof, including all such substances as are or may hereafter be trade-marked, patented or copyrighted and proprietary medicines, except on the written prescription of a licensed physician or "osteopathic physician duly licensed under the state medical practice act."

COLORADO

Society News.—Speakers before the Medical Society of the City and County of Denver, April 2, were Drs. George L. Monson and George F. Netherton, on "Acute Thyroid Crisis Following Thyroidectomy;" Clarence B. Ingraham Jr., "The Problem of Contraception," and Theodore E. Beyer, "Retropharyngeal Abscess." The society was addressed, April 22, by Dr. Herbert McLean Evans, Berkeley, Calif., on "Newer Conceptions of Pituitary Functions."

CONNECTICUT

Bill Passed.—H. 852 has passed the House and the Senate, proposing to repeal the laws regulating the sale, distribution and possession of narcotic drugs and to enact what apparently is the uniform narcotic drug act.

Bills Enacted.—The following bills have been enacted: S. 396, requiring both parties to proposed marriages, as a condition precedent to obtaining licenses to wed, to present statements from licensed physicians that both parties have submitted to a Wassermann or Kahn or other similar laboratory blood test and that the result of such test has proved negative, and H. 1152, authorizing the revocation of the license of any practitioner of the healing art who fails to file a birth certificate as required by law.

DISTRICT OF COLUMBIA

Medical Bills in Congress.—*Bill Introduced:* H. R. 8387, introduced by Representative Fenerty of Pennsylvania, proposes to require the commission on licensure to practice the healing art in the District of Columbia to issue a license to practice the healing art in the District of Columbia to Dr. Ronald A. Cox, Washington.

IDAHO

Annual Registration Due July 1.—All practitioners of medicine and surgery holding licenses to practice in Idaho are required by law to register annually on July 1 with the Department of Law Enforcement, and at that time to pay a fee of $2. If a licentiate has not paid the annual registration fee by October 1, his license can be canceled but will be restored within five years thereafter on payment of the delinquent fees and a $10 penalty. If a license has been canceled for more than five years, it can be reinstated only on the payment of $25 and on the licentiate's passing an examination, the nature of which shall be determined by the Department of Law Enforcement.

ILLINOIS

Bill Passed.—S. 238 has passed the Senate, proposing to so amend the medical practice act as to create a board of chiropractic examiners.

Bill Introduced.—H. 1085, to amend the medical practice act, proposes to raise the examination fee paid by an applicant for a license to $20 and to raise the fee for a license without examination to $50.

Society News.—Dr. Ralph A. Kinsella, St. Louis, discussed "Occlusion of the Coronary Arteries" before the Adams County Medical Society in Quincy, May 15.——Dr. Abraham A. Low, Chicago, assistant state alienist, conducted a psychiatric clinic at the Anna State Hospital, Anna, April 25, before a special meeting of the Union County Medical Society.——At a meeting of the Peoria City Medical Society, June 4, Dr. Philip C. Jeans, Iowa City, discussed recent nutritional trends.——Dr. Clarence O. Sappington, Chicago, addressed the Central States Society of Industrial Medicine and Surgery at Rockford, May 21, on "Occupational Disease Hazards."

Academy of Science Meeting.—The twenty-eighth annual meeting of the Illinois State Academy of Science was held at Bloomington, May 3-4. The following speakers, among others, participated in a program before the section on medicine and public health:

Dr. Joseph Howard Beard, health officer of the University of Illinois, Urbana, Rickets—Its Cause, Effect and Prevention.
Dr. Clarence O. Sappington, consulting industrial hygienist, Chicago, Significance of Occupational Diseases.
Fred W. Tanner, Ph.D., head, department of bacteriology, University of Illinois, Efforts to Control Quality of Foods in the United States.
Robert H. Gault, Ph.D., department of psychology, Northwestern University, Evanston, Some Implications of Vibrotactile Research.

New Society of Bacteriologists.—The Society of Illinois Bacteriologists was organized, May 8, at a meeting in the University of Illinois College of Medicine, Chicago, with Fred W. Tanner, Ph.D., Urbana, professor of bacteriology, University of Illinois, as president; Dr. Frederick O. Tonney, director of research, Chicago Department of Health, vice president, and H. S. Shaughnessy, Ph.D., director of laboratories,

Illinois State Department of Public Health, Springfield, secretary. A board of eleven governors is to be selected, each representing a particular group of bacteriologists, with one elected at large. Five members will represent universities and other educational institutions. The new society will be the Illinois branch of the Society of American Bacteriologists.

Chicago

Dr. Taliaferro Awarded the Chalmers Medal.—The Chalmers Medal of the Royal Society of Tropical Medicine and Hygiene has been awarded to William H. Taliaferro, Ph.D., associate dean, Division of Biological Sciences, University of Chicago, and chairman of the department of hygiene and bacteriology, "in recognition of his valuable contributions to knowledge of the subject of animal immunity." The Chalmers Medal is granted every two years to a man under 45 years of age who has "contributed signally" to research in tropical medicine. Dr. Taliaferro was recently appointed dean of the Division of Biological Sciences, succeeding Frank R. Lillie, Ph.D.

INDIANA

District Meetings.—The thirty-first annual meeting of the Fourth District Medical Society was addressed in Rising Sun, May 16, among others, by Drs. William B. Adams, Hanover, on "Glandular Therapy."——At a joint meeting of the Fifth District Medical Society and the Vigo County Medical Society in Terre Haute, May 3, Dr. Elmer L. Sevringhaus, Madison, spoke on "Pituitary and Ovarian Relationship in the Human Being."——Speakers before the Sixth District Medical Society in Rushville, May 9, included Dr. Stanley B. Gordin, Connersville, on "Uterine Hemorrhage."——The Ninth District Medical Society was addressed in Tipton, May 22, among others, by Drs. Luke W. Hunt, Chicago, on "Scarlet Fever Immunization and Treatment"; Aaron E. Kanter, Chicago, "Practical Application of Gynecology for the General Practitioner," and George W. Crile, Cleveland, "Acute Surgical Abdomen."——At a meeting of the Tenth District Medical Society in East Chicago, May 9, speakers were Drs. Lewis M. Hurxthal, Boston, on "Mechanism of Heart Beat and Electrocardiography"; Ernest E. Irons, Chicago, "Arthritis"; David S. Hillis, Chicago, "Treatment of Abortion"; Isaac A. Abt, Chicago, "Care of the New-Born"; Samuel W. Becker, Chicago, "Treatment of Syphilis," and Max Cutler, Chicago, "Newer Work in Treatment of Cancer by Radiation." Dr. Cutler also addressed the Eleventh District Medical Society in Delphi, May 15, on tumors, and Dr. Everett E. Padgett, Indianapolis, gallbladder disease.——Dr. Thurman R. Rice, Indianapolis, among others, addressed the Twelfth District Medical Society in Lake James, May 23, on "The Art of Living."

IOWA

State Medical Election.—Dr. Prince E. Sawyer, Sioux City, was chosen president-elect of the Iowa State Medical Society at its annual meeting in Davenport, May 10. Dr. Thomas A. Burcham, Des Moines, was inducted into the presidency. The next annual session will be held at Des Moines, May 13-15, 1936.

Dr. MacEwen Named Dean of State University.—The appointment of Dr. Ewen M. MacEwen, professor and head of the department of anatomy, State University of Iowa College of Medicine, Iowa City, as dean, is reported. Since the resignation of Dr. Henry S. Houghton in 1932, the affairs of the college have been in charge of an interim committee composed of Drs. John T. McClintock, Howard L. Beye and Everett D. Plass. Dr. Houghton left Iowa to become associate dean of the Division of Biological Sciences and director of the University Clinics of the University of Chicago; he has since resigned at Chicago to become advisory representative of the China Medical Board. Dr. MacEwen was born in Greenwich, P. E. I., Canada, and is a graduate of the State University of Iowa College of Medicine, class of 1912. He has been head of the department of anatomy since 1931.

KENTUCKY

Society News.—Drs. William T. McConnell, Louisville, and Robert P. Ball, Chattanooga, Tenn., addressed the Jefferson County Medical Society, May 6, on "Obstetrical Work in Louisville Hospitals in 1933" and "X-Ray Examination of the Obstetric Patient," respectively.——At a meeting of the Fifth District Medical Society in Carrollton, May 9, speakers were Drs. Fred W. Rankin, Lexington, on "Lesions of the Colon and Rectum"; Louis G. Herrmann, Cincinnati, "Obliterative Arterial Diseases of the Extremities—Treatment by Passive Vascular Exercises," and Henry Kennon Dunham, Cincinnati, "Treatment of the Tuberculous Patient in the Home."——Dr. L. Wallace Frank addressed the Louisville Surgical Society, May 10, on "Carcinoma of the Lip, Tongue and Oral Cavity."——Dr. James R. Stites, Louisville, addressed the Society of Physicians and Surgeons, Louisville, May 16, on transurethral resection.——Dr. Louis G. Herrmann, Cincinnati, addressed the Louisville Medico-Chirurgical Society, April 12, on "The Physiologic-Pathologic Basis for the Treatment of Peripheral Vascular Diseases."——Drs. Perry Bromberg, Nashville, Tenn., and William S. Ehrich, Evansville, Ind., addressed the Christian County Medical Society, Hopkinsville, April 16, on "Significance of Hematuria" and "Future Treatment of Prostatic Hypertrophy," respectively.

MICHIGAN

Personal.—Howard B. Lewis, Ph.D., director of the University of Michigan College of Pharmacy and professor of physiological chemistry in the medical school, has been elected a member of the National Board of Medical Examiners of the United States, succeeding the late Prof. Otto K. O. Folin of Harvard University.——Mr. William J. Burns, Detroit, executive secretary of the Wayne County Medical Society, was married, May 1, to Miss Josephine Alice Murphy. They left on an airplane for New York, going thence to California via the Panama Canal.——Dr. Buell H. Vanleuven, councilor of the thirteenth district, was elected mayor of Petoskey recently.——Dr. Robert B. Harkness, formerly of Houghton, has been named director of the health department of Eaton County.

Eight Physicians Presented with Life Memberships.—At a testimonial dinner in the Jackson Country Club, Jackson, April 11, life memberships in the Jackson County Medical Society were presented by eight physicians and one layman, Mr. C. B. Hayes. The physicians are Drs. Joseph C. Kugler, Frederick W. Rogers, Arthur J. Roberts, Henry Gray Glover, William W. Lathrop, Walter E. Spicer, Jackson, Herbert H. Frazier, Hanover, and James McColgan, Grass Lake. Drs. Frazier and McColgan were unable to be present. The dinner was in recognition of their long years of service in the practice of medicine. The youngest physician was Dr. Frazier, who is 66 years of age, and the oldest, Dr. Spicer, 80 years. Tribute was paid to Mr. Hayes for his part in "forwarding the industrial fortunes of Jackson."

NEW YORK

Health Officers' Conference.—The annual conference of health officers and public health nurses will be held at Saratoga Springs, June 26-28. The State Association of School Physicians and of the American Association for Hygiene and Baths will meet at the same time.

Machine for Making Artificial Radium.—An appropriation at the University of Rochester will be made to cover the cost of building a machine to manufacture artificial radium, newspapers announce. The device, called a five-million volt accelerator, will be the second of its kind in the country and will be assembled during the summer in the Bausch and Lomb Building under the direction of Lee A. Dubridge, Ph.D. The machine will manufacture artificial radium at less expense than the cost of true radium.

New York City

County Society Library.—The library of the Medical Society of the County of Kings reported that in 1934 readers using its facilities increased to 14,164 from 13,079 in 1933. The number of books consulted was 62,079, and the number taken out for home use was 10,620. During the year 782 volumes were added to the library. It received regularly 1,500 current serial publications.

Survey of Syphilis.—The New York City Department of Health is cooperating with the U. S. Public Health Service in making a survey during June on the incidence of syphilis. To assure as complete returns as possible, each physician, hospital and clinic will be provided with suitable instructions and record forms. According to New York *Medical Week*, the study will be confidential, intended primarily for statistical purposes and not for the purpose of checking against previous reports submitted by physicians and clinics. Two questions will be asked: The number of early and late cases of syphilis diagnosed for the first time during the month of June and the number of early and late cases diagnosed before June 1, but treated or observed during the month of June.

Woman's Hospital Eighty Years Old.—The Woman's Hospital, founded by Dr. J. Marion Sims in 1855, marked its eightieth anniversary, May 4, by a display of historic instruments and souvenirs. Among them were a medal of the Legion of Honor of France given to Dr. Sims by Napoleon III in

recognition of his treatment of the Empress Eugenie and a speculum used during the operation. Portraits of many persons identified with the hospital and a copy of "Frank Leslie's Illustrated Weekly," showing the hospital's celebration of its first anniversary were also shown. The Woman's Hospital is said to have been the first hospital in the world to be financially sponsored by women for treatment of diseases of women. It has occupied three buildings, the present one dating from 1906.

Courses for Doctor of Medical Science Degree.—Graduate courses in the departments of forensic medicine, medicine, ophthalmology, pediatrics, radiology and surgery, some of which may lead to the degree of doctor of medical science, are announced by New York University College of Medicine. For admission, the college requires graduation from an approved medical college, completion of internship in an approved hospital, and approval by the department in which the work is to be taken. For the degree the following requirements are listed: (1) Not less than three years' full time work or the equivalent in the university or in laboratories or hospitals recognized by it, with at least one year at New York University; (2) intensive graduate training in the basic sciences and other fields as recommended by the departments concerned; (3) active experience of not less than eighteen months of full time work or the equivalent in wards, clinics and diagnostic laboratories of the clinical specialty in which the work for the degree is being done; (4) satisfactory performance in examinations, and (5) a thesis based on original work. The university announces that courses not leading to the degree are also offered in the departments mentioned.

Council to Foster Research.—Formation of the Research Council of the Department of Hospitals to foster medical research in the municipal hospitals is announced in New York *Medical Week*. Efforts will be made to improve treatment of chronic diseases through a clinical division under a director to be appointed by the commissioner of hospitals after nomination by the College of Physicians and Surgeons of Columbia University. Mr. Marshall Field is chairman of the council, Mr. George MacDonald, vice chairman, and Dr. Bernard Sachs, treasurer. Among twenty-nine other members are the following physicians:

George Baehr	William H. Park	Samuel J. Kopetzky
Ernst P. Boas	Douglas Symmers	James Alexander Miller
Arthur C. deGraff	Luther F. Warren	Walter W. Palmer
John A. Hartwell	Linn J. Boyd	Henry James Spencer
Emanuel Libman	Alfred E. Cohn	Bettina Warburg
Eugene L. Opie	Alphonse R. Dochez	

A public appeal is being made for $25,000 to initiate the studies, but it is hoped the city government will later appropriate funds to continue them.

OHIO

Health at Columbus.—Telegraphic reports to the U. S. Department of Commerce from eighty-six cities with a total population of 37 million for the week ended June 1, indicate that the highest mortality rate (20.3) appears for Columbus, and the rate for the group of cities as a whole, 11.5. The mortality rate for Columbus for the corresponding period last year was 16.3 and for the group of cities, 11.2. The annual rate for eighty-six cities for the twenty-two weeks of 1935 was 12.4 as against a rate of 12.3 for the corresponding period of the previous year. Caution should be used in the interpretation of weekly figures as they fluctuate widely. The fact that some cities are hospital centers for large areas outside the city limits or that they have a large Negro population may increase the death rate.

Graduate Clinic for Academy of Medicine.—The department of postgraduate medicine of the University of Michigan School of Medicine offered its third annual clinic for the Toledo Academy of Medicine, May 22, at the University Hospital, Ann Arbor. In the morning, Drs. Willis S. Peck, Cyrus W. Strickler Jr., and Carl F. Huber discussed "Results of Therapeutic Fever"; Henry Field Jr., "Fusospirochetal Pneumonia," and Paul S. Barker, "Pituitary Basophilism." The following physicians participated in the afternoon session:

Franklin D. Johnston, Value of the Phase Angle in Diagnosing Hyperthyroidism.
Reed M. Nesbit, Artificial Acidosis by Diet and Drugs in Treating Urinary Tract Infections.
Stanley M. Goldhamer, Presence of the Blood-Stimulating Factor in the Gastric Secretion of Patients with Pernicious Anemia.
Richard H. Freyberg, Subcutaneous Insulin Injections and Their Reaction to the Stimulation of Appetite.
Jerome W. Conn, Treatment of Diabetic Coma with Especial Relation to the Use of Sodium Bicarbonate.
Frederick A. Coller, Water Balance in Preoperative and Postoperative Cases.

OKLAHOMA

Society News.—Dr. Horace Reed, Oklahoma City, addressed the Kingfisher County Medical Society, Kingfisher, recently, on health insurance and socialized medicine. The society adopted a resolution expressing its opposition to the health insurance movement.

State Medical Election.—Dr. Charles H. Haralson, Tulsa, was chosen president-elect of the Oklahoma State Medical Association at its annual meeting, May 13-15, and Dr. Louis H. Ritzhaupt, Guthrie, was inducted into the presidency. The next annual session will be held at Enid.

PENNSYLVANIA

Bill Introduced.—S. 1528, to amend the laws regulating the practice of osteopathy, proposes to prohibit an osteopath from using the title "Doctor" or the abbreviation "Dr." before his name without the word "Osteopath" or "Osteopathist" or the words "Osteopathic Physician" immediately following his name.

Radiological Society Meeting.—The Pennsylvania Radiological Society held its annual meeting in Pittsburgh, May 17-18. A symposium on radiation therapy was presented in the morning by Drs. Zoe Allison Johnston, Pittsburgh, John M. Keichline, Huntington, John F. McCullough, Pittsburgh, and Byron H. Jackson, Scranton, and Dr. Max Kahn, Baltimore, led a round table discussion on bone tumors Saturday morning. Other speakers included Drs. Josiah R. Eisaman, Pittsburgh, on "Roentgenological Study of the Chest with Iodized Oils"; George W. Grier, Pittsburgh, "Colitis," and Paul G. Bovard, Tarentum, "Pneumoconiosis."

Philadelphia

Abortionist Sentenced.—T. R. Anderson a Negro, was sentenced, April 11, to serve from one to five years in the state penitentiary for performing a criminal abortion and practicing medicine without a license.

Medical College News.—Dr. Esther M. Greisheimer, associate professor of physiology at the University of Minnesota Medical School, gave a series of lectures at the Woman's Medical College of Pennsylvania during April on physiology of the nervous system. Dr. Evelyn M. Anderson of McGill University Faculty of Medicine, Montreal, is guest lecturer during May on physiology of the endocrine system. Dr. David Riesman, Philadelphia, delivered the first Alpha Omega Alpha lecture at the college, April 16, on "Bases of Medical Ethics." Dr. Edward Martin, emeritus professor of surgical physiology, University of Pennsylvania School of Medicine, was awarded the honorary degree of doctor of laws by Temple University, June 13. The University of Pennsylvania recently received a portrait of Dr. Philip Syng Physick by Thomas Sully. Dr. Physick was professor of surgery at the university from 1805 to 1819 and professor of anatomy from 1819 to 1831. The portrait was presented by Mrs. John F. Lewis.

Pittsburgh

Society News.—Speakers at a meeting of the Pittsburgh Academy of Medicine, May 14, were Drs. Leslie H. Osmond, on "Present Status of Radiation Therapy"; James D. Heard, "A Study of Electrocardiograms Derived from Eleven Fetuses Through the Medium of Direct Leads" and Cortlandt W. W. Elkin, "Evolution of Carbohydrate Diets in Diabetes Mellitus." Dr. George E. Martin has been appointed director of the Pittsburgh Tuberculosis Hospital.

SOUTH DAKOTA

State Medical Election.—Dr. James L. Stewart, Nemo, was chosen president-elect of the South Dakota State Medical Association at its annual meeting at Pierre, May 15, and Dr. Albert S. Rider, Flandreau, was installed as president. Dr. Earle A. Pittenger, Aberdeen, was named vice president, and Dr. John F. D. Cook, Langford, reelected secretary. The next annual meeting will be held at Sioux Falls. It was tentatively announced that the session would be a joint one with the state dental association.

TEXAS

Hospital News.—Three new units at the Veterans' Administration Facility, Waco, will be started about July 1; the administration has made $1,081,500 available, including $900,000 for 466 additional beds for white patients, 164 for Negroes and 138 for acute cases, it was stated.

State Medical Election.—Dr. Howard R. Dudgeon, Waco, was chosen president-elect of the Texas State Medical Association at its annual meeting in Dallas, May 16, and Dr. John

H. Burleson, San Antonio, was inducted into the presidency. Vice presidents are Drs. Olin F. Gober, Temple; Oscar M. Marchman, Dallas, and Thomas M. Dorbandt, San Antonio. The next annual session will be held in Houston.

District Meeting.—The semiannual meeting of the South Texas District Medical Society was held in Beaumont, April 11-12. Among speakers were Drs. Titus H. Harris, Galveston, on "Psychiatry as Related to General Medicine"; Llewellyn H. Ledbetter, Beaumont, "Radiography of the Heart and Great Blood Vessels"; John R. Phillips, Houston, "The Thyroid and Its Surgical Considerations" and George Sladczyk, Port Arthur, "Problems of Industrial Surgery." Dr. Samuel E. Thompson, Kerrville, spoke on medical economics at a banquet in the evening of April 11.

Society News.—Drs. William S. Horn and Edwin G. Schwarz, Fort Worth, presented papers before the Tarrant County Medical Society, April 3, on "Pulmonary Indications for Therapeutic Abortion" and "Progress in Active and Passive Immunization of Children," respectively.——Speakers before the Wichita County Medical Society, April 9, were Drs. Walter B. Whiting and Robert L. Hargrave, Wichita Falls, on diagnosis of heart disease and fibrosarcoma of the extremities, respectively.——The Texas Society for Mental Hygiene was recently organized with Dr. James Shirley Sweeney, Dallas, as president of the board of directors.——Speakers at a special meeting of the Dallas County Medical Society, Dallas, May 2, were Drs. John O. McReynolds, on "Intra-Ocular Malignant Neoplasms"; Robert L. Moore, "Use of Sodium Lactate in Treatment of Acidosis"; Glenn D. Carlson, "Multiple Myeloma," and Robert H. Milwee, "X-Rays and Radium in Carcinoma of the Cervix and Fungus."

VIRGINIA

Society News.—Dr. Lewis E. Jarrett, superintendent of the hospital division, Medical College of Virginia, Richmond, was elected president of the Virginia Hospital Association at its annual meeting in conjunction with the associations of North and South Carolina in Greensboro, N. C., April 12.——Drs. Arthur C. Christie and William P. Herbst Jr., Washington, D. C., addressed the Roanoke Academy of Medicine, April 1.——Dr. Richard Kovacs, New York, addressed the Richmond Academy of Medicine, April 23, on the present status of physical therapy.

WASHINGTON

Society News.—Speakers at the meeting of the King County Medical Society, Seattle, May 20, were Drs. Byrl R. Kirklin and David M. Berkman, Rochester, Minn., on roentgenologic examination of the alimentary tract and treatment of peptic ulcer, respectively.

Personal.—Dr. Clyde B. Hutt has been named in charge of the city-county health department at Vancouver, succeeding Dr. Robert W. Armstrong, resigned.——Dr. Walter Kelton, Seattle, has been appointed surgeon to federal prisoners to succeed Dr. Don H. Palmer, who resigned after several years' service.——Dr. Walter C. Aylen has succeeded Dr. William H. Brandt as health officer of Auburn. Dr. Brandt has resigned.

Annual Graduate Course.—The University of Washington, Seattle, will present its annual graduate course of lectures and clinics, July 15-19. Lecturers will be Drs. Arthur E. Hertzler, Halstead, Kan., who will deal with the thyroid, gastro-intestinal and gynecologic diseases; Oliver H. P. Pepper, Philadelphia, evolution of disease, heredity in diseases of the blood, late effects of congenital lesions, trichiniasis, hypotension and Hodgkin's disease; Paul J. Hanzlik, Stanford University, digitalis, hypnotics, new metabolic stimulants and other pharmacologic subjects, and Russell S. Ferguson, New York, on applied urology with special emphasis on malignancy.

WISCONSIN

William Snow Miller Lecture.—Leslie B. Arey, Ph.D., Robert Laughlin Rea professor of anatomy, Northwestern University Medical School, Chicago, delivered the annual William Snow Miller lecture at the University of Wisconsin, May 2. His subject was entitled "Factors That Influence the Course of Wound Healing."

Bill Passed.—A. 422 has passed the Assembly and the Senate, proposing to amend the laws relating to the practice of chiropractic so as to raise the annual registration fee required of chiropractors to $5 and to make the annual registration of a chiropractor contingent on his attending within the preceding year at least one of the two day "educational" programs conducted by the Wisconsin Chiropractic Association.

Personal.—Dr. Marcos Fernan-Nunez, professor of pathology and bacteriology, Marquette University School of Medicine, Milwaukee, has been elected an academician of the National Academy of Medicine of Spain.——Dr. Herman A. Schulz, Edgar, has been appointed coroner of Marathon County, succeeding the late Dr. John R. M. Frawley, Wausau.——Dr. William C. Felton has been elected health commissioner of Appleton, succeeding Dr. Frank P. Dohearty, who held the position for seven years.

PHILIPPINE ISLANDS

Society News.—Dr. Pedro T. Lantin, Manila, addressed a recent meeting of the Bulacan Medical Society, on "Blood Transfusion in the Treatment of Typhoid Fever."——Speakers at the annual meeting of the Culion Medical Society in January were Drs. Jose O. Nolasco, Culion, on "The Leprosy Problem in the Philippines and Leprosy in Norway" and Drs. Casimiro B. Lara and Bonifacio de Vera, Culion, "Clinical Observations with Respect to Early Leprosy in Children of Lepers."

GENERAL

Bequests and Donations.—The following bequests and donations have recently been announced:

Community Hospital, Big Rapids, Mich., $6,000 by the will of the late Mrs. C. H. Milner.

Under the wills of Louis and Henry L. Weinberger, the following will receive $10,000 each: Eaglesville Sanatorium, Jewish Hospital Association of Philadelphia, Temple University, Lankenau, Jefferson Medical College and University of Pennsylvania and Mount Sinai hospitals, $2,000 each will go to Women's Homeopathic, Northern Liberties, Northwestern General, St. Luke's and Children's hospitals.

Memorial to Dr. O'Dwyer.—The eleventh annual meeting of the American Association of the History of Medicine in Atlantic City, May 6, was dedicated to the memory of Joseph O'Dwyer, New York, who, fifty years ago, demonstrated improved laryngeal intubation and published his first article on the new life saving treatment of laryngeal diphtheria. Through the courtesy of Dr. James W. Crane of the University of Western Ontario Medical School, London, and Dr. Jabez H. Elliott, Toronto, there was exhibited at the meeting both Dr. O'Dwyer's "doctor's bag" in which he transported the intubation set and a model of all his instruments. Dr. Chevalier Jackson, Philadelphia, gave the address, reviewing Dr. O'Dwyer's life and his work. Dr. William S. Middleton, Madison, Wis., was elected president; Dr. Walter C. Alvarez, Rochester, Minn., vice president, and Dr. Edward J. G. Beardsley, Philadelphia, secretary. The next meeting will be held in Atlantic City in May 1936.

Society News.—The new officers of the American Physiological Society are Drs. Frank C. Mann, Rochester, Minn., president; Andrew C. Ivy, Chicago, secretary, and Alexander Forbes, Boston, treasurer.——Howard B. Lewis, Ph.D., Ann Arbor, was recently elected president of the American Society of Biological Chemists; Glenn E. Cullen, Ph.D., Cincinnati, vice president; Henry A. Mattill, Ph.D., Iowa City, secretary, and Dr. Cyrus H. Fiske, Boston, treasurer.——Officers of the American Society for Pharmacology and Experimental Therapeutics elected at the recent annual meeting are Drs. Velyien E. Henderson, Toronto, president; Oscar H. Plant, Iowa City, vice president; Eugene M. K. Geiling, Baltimore, secretary, and Charles M. M. Gruber, Philadelphia, treasurer.——Dr. Oskar Klotz, Toronto, was chosen president of the American Society for Experimental Pathology, recently; Dr. Alphonse B. Dochez, New York, and Dr. Shields Warren, Boston, secretary.——At the recent annual meeting of the Federation of American Societies for Experimental Biology, Dr. Velyien E. Henderson, Toronto, was named chairman of the executive committee; Dr. Eugene M. K. Geiling, Baltimore, secretary, and Dr. Charles M. M. Gruber, Philadelphia, treasurer.——New officers of the Association of American Physicians, elected May 8, are Drs. Rollin T. Woodyatt, Chicago, president; Thomas R. Boggs, Baltimore, vice president; Hugh J. Morgan, Nashville, Tenn., secretary. The next annual session will be held at Atlantic City, May 5-6, 1936.

LATIN AMERICA

American Congress of Urology.—The First American Congress of Urology, which was to have been held in Rio de Janeiro, January 21-26, was postponed and is now announced for August, according to information received by the U. S. Department of State. Physicians from the United States are invited to attend.

FOREIGN

Society News.—The International League Against Rheumatism will hold its fifth congress at Lund, Sweden, in September, 1936. Dr. S. Ingvar, professor of internal medicine, University of Lund, has been elected chairman and Dr. Kahlmeter, Stockholm, secretary. Further information may be obtained from the secretary of the league, Dr. J. van Breemen, Keizersgracht 489, Amsterdam, Holland.

Congress on Gastro-Enterology in Brussels.—Physicians from the United States who are to attend the First International Congress of Gastro-Enterology to be held in Brussels, Belgium, August 8 to 10, will make up a party on the S. S. Champlain, which is scheduled to sail July 27. Complete information may be obtained from Dr. Anthony Bassler, 784 Park Avenue, New York. Registration for the international congress will close on June 30. Application may be made to Dr. George L. Laporte Jr., 129 East Ninety-First Street, New York.

Congress of Comparative Pathology.—The third International Congress of Comparative Pathology will be held in Athens, Greece, April 15-18, 1936. Subjects on which special reports will be made are nephrosis and amyloidosis, leishmaniasis, and spirochetosis and avitaminosis. The congress will study diseases of man and animals, including the relations existing between diseases of the different species; it will also study plant pathology and the relationship between certain plant and animal diseases. Further information may be obtained from Prof. Anthony Codounis, 40, Didotou Street, Athens.

Memorial to Leon Bernard.—The Health Organization of the League of Nations has announced the creation of a Leon Bernard Foundation for a prize in social medicine in memory of the late Professor Bernard, permanent representative of France to the health commission of the league. Dr. Bernard was especially active in the international fight against tuberculosis and was secretary general of the International Union Against Tuberculosis. Contributions to the foundation are requested. They may be addressed to Dr. Ludwik Rajchman, medical director, Health Section, League of Nations, Geneva, Switzerland.

New Medical Practice Act in Denmark.—The first national law governing medical practice recently went into effect in Denmark, according to a report received by the U. S. Department of State. Beginning January 1, physicians were to be licensed only after having spent a year in a hospital and lying-in station; under special circumstances, persons who have obtained the corresponding training in a foreign country may be authorized to practice. Foreigners may not practice unless they have become citizens, have lived in the country at least ten years and have obtained either regular authorization or special permission. Among other provisions of the new regulations are a ruling that physicians may not act or assume the title of specialist unless their qualifications have been recognized by a "specialist council." Physicians are not allowed to operate a drug store or to be connected with the manufacture of drugs. They are obliged to extend first aid when called on. The law requires a physician to report to the department of health diseases or mental defects of patients who may constitute a danger to others; he is bound to secrecy, however, concerning professional information unless the law requires him to talk or if he feels it is in the interest of the public welfare to do so. Physicians are forbidden to strike. The law also provides that a physician may charge "a reasonable fee" for his services; furthermore, if a physician associated with a public hospital is entitled to payment, the amount is fixed by the regulations of the hospital. Rigid regulations against quackery are included in the new law. According to the report, "a quack doctor who exposes the health of a patient to danger through the treatment of infectious diseases or by operations or through cures at private clinics shall be punished by imprisonment of up to three months." A person who gives the impression through advertising or otherwise that he is a physician is to be fined and a physician who cooperates with a quack is also liable to fines or imprisonment.

CORRECTION

Relapsing Fever in the United States.—In the article by Dr. James O. Gillespie in THE JOURNAL, May 25, page 1878, appears the statement "A single intravenous injection of neoarsphenamine, 0.1 Gm. for each kilogram of body weight, administered at the onset of a paroxysm, will effect a cure in practically every case." Obviously this should, of course, read ". . . 0.01 Gm. for each kilogram . . ."

Foreign Letters

LONDON

(From Our Regular Correspondent)

May 18, 1935.

Report of Conference on the Reform of Medical Education

The reform of medical education has been under discussion for years. Last year the British Medical Association made a report on the subject (THE JOURNAL, May 26, 1934, p. 1772). There has been published now the report of a conference of representatives nominated by the Universities of Oxford, Cambridge and London, the Royal College of Physicians, the Royal College of Surgeons and the Society of Apothecaries on the medical curriculum, all leading teachers of the day. Their recommendations, which follow, will if carried into effect mark an epoch in medical education in this country:

The object is to give the student "such knowledge and such education as will enable him to approach the problems of practice with some degree of confidence and with legitimate hope that his scientific outlook on health and disease will enable him to learn from subsequent observation and experience." The ruinous policy of surcharging the memory with facts is condemned. The course of instruction is divided into three main parts—premedical, preclinical and clinical. In the premedical period the future medical student should not receive special instruction, as is done at present, but should study science with his fellow pupils. It is also recommended that the first M.B. or examination in the basic sciences might be taken before matriculation by means of a higher school certificate. This would ensure the continuance of the general education after matriculation. The minimum length of the medical curriculum should not be extended beyond the present five years. Medical studies proper, i. e., anatomy and physiology, should not be begun before the age of 18.

THE PRECLINICAL PERIOD

During the first two years of medical studies the work of the student should be arranged by a board of teachers representing anatomy, physiology, chemistry, biochemistry, pharmacology and pathology. During the first four terms of medical studies the student should continue the study of chemistry, work in the dissecting room and department of anatomy, and in the second term begin the study of elementary physiology and biochemistry. During the fifth and sixth terms, while continuing anatomy and physiology, he should be introduced to the principles of general pathology, immunology and bacteriology by a pathologist. The teaching of organic, physical and colloidal chemistry should be determined by a conference between the teachers of physiology, biochemistry and chemistry, due weight being given to the opinions of the teachers of physiology on the special needs of medical students. The teacher of anatomy should be given access to hospital material for the teaching of applied anatomy, with or without the assistance of a clinician. During the second year of medical studies the teacher of physiology, being provided, if necessary for this purpose, with a clinical assistant, should give demonstrations in applied physiology and familiarize the student with use of the stethoscope, ophthalmoscope, laryngoscope and otoscope. During this year the teaching of pharmacology, including toxicology, should be arranged in close cooperation with the teachers of physiology. The student should also attend a short course of elementary medical psychology.

At the end of two years' medical study there should be an examination by a board of representatives of anatomy, physiology, pharmacology and pathology. There should be no separate examination in organic chemistry, but knowledge of this

subject should be tested in the examination in physiology. There should be no separate examination in pharmacology. A reduction should be made in the amount of detail required in the examination in anatomy.

THE CLINICAL PERIOD

Throughout the clinical period, pathology should be taught by the pathologist continuously in close association with the bedside study of disease, so that the student will instinctively think in terms of pathology. There should be a short course in public health, including forensic medicine, and the main part of the course should be under the direction of a member of the public health service selected for his ability to teach. Fortnightly demonstration should be given in the wards of a hospital of patients illustrating the common "mental" or "nervous" disorders associated with illness of any kind. In addition, the student should attend at least six demonstrations at a mental hospital and receive instruction in regard to insanity and mental deficiency.

Accidental Perforation of the Internal Jugular Vein During Operation

At a meeting of the Section of Surgery of the Royal Academy of Medicine in Ireland, Mr. R. Atkinson Stoney reported an unusual accident that occurred during phrenic avulsion under local anesthesia. When the deep fascia covering the scalenus anticus was exposed, the assistant, who was using a blunt hook to retract the omohyoid, changed it to retract the outer border of the sternomastoid and in so doing perforated the internal jugular vein. The hemorrhage was checked by pressure of the vein forward against the sternomastoid. It was found impossible to catch the torn portion of the vein in forceps, but by including a portion of the sternomastoid muscle the vein could be occluded above and below the injury in large clamps. Then the vein was isolated and a double catgut ligature was passed with an aneurysm needle and tied above and below the tear. The nerve was then found and evulsed in the ordinary way. As the patient was not under a general anesthetic and the incision was limited, the difficulty of isolating and tying the vein was considerable. In view of such a possibility, Mr. Stoney thought that it would be advisable to avoid the use of a blunt hook in this operation, since, though the operator had a good view of the internal jugular, his assistant on the other side of the table had not and was liable to overlook the fact that it lay immediately under cover of the posterior border of the sternomastoid and was exposed to injury. The patient suffered no ill effects and the wound healed normally.

The Eight Hundredth Anniversary of Maimonides

The Bodleian Library, Oxford, has put on exhibition some famous manuscripts in the handwriting of the philosopher-physician Moses Maimonides, with many translations and first editions to celebrate the eight hundredth anniversary of his birth. Moses ben Maimon, usually called Maimonides, was the most important Jewish scholar of the middle ages. He left Spain in 1160, spent five years at Fez and passed on to Egypt, where he remained until his death at Cairo in 1204. He became celebrated as an authority on Jewish dogma and law, which he was the first to codify in his work Misneh-Torah, produced in 1180. But by profession he was a physician and acted in that capacity for Saladin and his sons. He wrote a number of medical books, which appeared in Arabic, though he appears to have used the Hebrew alphabet himself. He is best known by his great philosophical work "Guide for the Perplexed," which was soon translated into Latin and had a considerable influence on medieval philosophy.

The sister University of Cambridge is celebrating the anniversary by an exhibition of manuscripts and early printed editions and also by the following series of lectures: "The Philosophical System of Maimonides and Its Place in the History of Thought," by Dr. S. Atlas, formerly professor of philosophy at Warsaw; "Maimonides' Theory of the State," by Dr. E. Rosenthal, and "The Place of Maimonides in Medicine and Science," by Dr. A. P. Cawadias. The British Museum has also put out an exhibition of the works of Maimonides.

PARIS

(From Our Regular Correspondent)

May 10, 1935.

Identity of Inguinal Lymphogranulomatosis and Certain Forms of Rectocolitis

At the April 9 meeting of the Academy of Medicine, C. Levaditi, Mollaret and Reinié reported the results of an experimental study as an answer to some doubts as to the identity of the etiology of inguinal lymphogranulomatosis and certain proliferative forms of rectocolitis, expressed by Frei at the 1934 session of the French Surgical Congress. Levaditi and his associates demonstrate, in the present paper, the absolute identity between the lymphogranulomatous virus isolated from a case of primary rectocolitis and that isolated from the inguinal lymph nodes in cases of true Nicolas-Favre disease. This identity is corroborated by experiments on animals, such as the chimpanzee and the mouse, which are susceptible to inoculation with the virus, as well as by inoculations of patients suffering from dementia paralytica. The inoculation of the virus obtained in the case of rectocolitis into the inguinal lymph nodes in a case of dementia paralytica resulted in a swelling of the lymph nodes and a perilymphadenitis, with an accompanying specific allergic state toward the antigen prepared by Frei as well as toward an antigen prepared with the virus from a patient with the Nicolas-Favre disease, which had been inoculated successively into monkeys. All these experimental proofs show that the pathogenesis of the Nicolas-Favre disease and certain proliferative forms of rectocolitis is the same. They are both due to the ultravirus of lymphogranulomatosis.

A New Protest by Medical Students

A renewed protest of French medical students against the foreign invasion of the profession took place March 29. Instead of riotous demonstrations such as occurred in February, one witnessed a dignified assembly in which the speeches were more temperate in character. Only one incident occurred to mar the occasion. One of the strikers invaded the pharmacology laboratory in the Paris Medical School and was repulsed with a bottle of formaldehyde solution. The report immediately spread to the crowds in front of the building that the person who defended the invasion of the laboratory had been one of the female instructors. When she left the building, unconscious of having been supposed to be the person who liberated the formaldehyde fumes, she was attacked, her clothes were torn off, and she would have been badly beaten had not the police intervened. On the following day, 2,000 students met in the courtyard of the school and in a more calm and dignified manner gathered round their leader, who expressed their grievances. Of 6,000 physicians in the department in which Paris is situated, more than 1,000 were said to be foreigners. Many foreigners had taken advantage of the laxity of the French laws and had not been obliged to comply with the same preliminary requirements, such as the passing of the bachelor of arts examinations, which French students must fulfil before being admitted to the medical schools. Furthermore, many foreign students, when they were admitted, contemplated only passing the final examinations leading to a degree, which did not permit them to practice medicine in France and its colonies. However, through laxity on the part of some of the faculties, this "honorary" had been allowed to be converted into a "state" diploma.

Foreigners have always been welcomed to France, and every possible facility has been placed at their disposal to profit by their stay here.

After parading the streets around the medical school, in the single file so typical of French students, under police escort, the assembly returned to the classrooms, hoping that their protests, supported by the warm endorsements of medical societies and the new laws, would have the necessary effect in checking the crowding out of the native by foreign students.

Opinion on the Foreign Physicians Question

In the April 21 issue of the *Concours médical* the question that has led to so much acrimonious discussion and to student strikes during the last four months was fully revived by Lavalée, one of the editors. He quoted previous articles on the same subject by other members of the staff, stating that a foreigner who wished to practice in France must complete the same course of studies and the same length of military service as French citizens.

Furthermore, if the law proposed should be passed, a foreigner must have been naturalized a minimum of ten years before graduation. The invasion of the profession by foreigners had become a grave menace to those born in France. The students could not be blamed for making a protest, in view of their future prospects of earning a living in their own country.

Lavalée stated that France had always received with open arms and was proud to be considered a haven of refuge for Russian aristocrats, antifascist Italians, German Jews and monarchist Spaniards. The French felt themselves honored to have students of all nations take advantage of the educational opportunities. Unfortunately, some of these refugees took advantage of the hospitality extended to them to continue their propaganda and to start riots and other objectionable incidents. Many of these foreigners have not, as in other countries, been fused, in the "melting pot," to become citizens that France could be proud of. The medical profession is gravely menaced; the younger generation feels it keenly, and hence France must take every possible measure to prevent further abuse of its hospitality. Regrettable as it would seem to many of the profession who feel flattered that French culture should attract so many foreigners, self protection demands stricter measures in the future to prevent French physicians from being crowded out by foreigners who do not intend or are unable to return to their native lands to practice.

Measures to Combat the Effects of Gas Attacks

Although the war clouds are dispersed for the present, the people living in Paris and its immediate vicinity will soon be awakened from their lethargy, in the form of demonstrations on May 28 as to the method of dealing with incendiary bombs. All the procedures now employed in Italy will be demonstrated with the aid of the Italian air attaché. Similar meetings have been held in other European countries. A sort of general rehearsal will be staged as to how the civilian population should behave during gas attacks.

Two issues of the *Paris médical*, those of March 30 and April 13, are devoted to "gaz de combat." In the first issue Moynier summarizes the present knowledge of the clinical lesions due to gas in war, the treatment of intoxications and the classification of gases employed as suffocants, vesicants, those with general toxic effects and irritant toxic gases, and he presents a plan of organization for the care of civilians and soldiers exposed to gas. In the April 13 issue the elements of military toxicology are discussed by Cordier and Magne, the bases of protection against combat gases by Renaut, and the collective protection of civilian populations against gas attacks by Dubrisay.

These articles show that these questions have again assumed the importance they enjoyed during the World War.

BERLIN

(From Our Regular Correspondent)

April 8, 1935.

University Students and University Study

The feeling of unrest that has manifested itself among the students of Germany for some time appears to be gradually subsiding. The authorities are taking a different attitude toward the students and are beginning to insist that the demands of politics and of sports shall not be allowed to interfere with scientific work. The student corporations, or fraternities, have succeeded in resisting the exertion of any undue political influence on their societies, which threatened the very existence of their organizations. Nevertheless, a division within the "corporations" has taken place, the dividing line being the degree to which national-socialist principles have been carried out. Recently the "Gemeinschaft Studentischer Verbände" was created, which "approves the principles of the 'corporations' of German students" but supports also the tenets of the national-socialist party. It is hoped that the creation of this "gemeinschaft" will settle all difficulties within the "corporations."

Importance is attached to a number of new decrees promulgated by the minister having jurisdiction. Among other changes he has issued a new penal code applicable to students, whereby the penal power of the German universities is made uniform. As had already been done with reference to the administration of the universities, the rector, or president, has been given a preeminent position of power as the preserver of discipline. According to the new penal code for universities, misdemeanors on the part of students will be punished from the standpoint of honor, the imposition of fines and university-prison (karzer) sentences having been abolished. The imposable penalties are oral reproof, written rebuke, withholding of credit for the current semester, expulsion from the university and, finally, exclusion from study at any German university.

The limitations imposed last year on the admission of graduates from secondary schools to university study (THE JOURNAL, March 3, 1934, p. 710) have recently been abolished by the federal minister of education. Now, as before, all such graduates may be admitted to university study. They must, however, first perform their duties in the government labor camps. The reasons assigned for such action are of interest. It is stated that "the attendance at all German universities has fallen off to such an extent that the restrictions on admission to university study, such as were imposed last year, no longer seem necessary." Of late (before the issuance of any special order) the restrictions had been applied in a more liberal manner. It is now the plan to make a careful selection of suitable pupils within the schools, concerning which special instructions will be issued later.

In the smaller university towns, in which a large portion of the population is dependent on the students for a living, the decline in attendance resulting from the imposition of too drastic restrictions had awakened great concern, particularly because of the fact that the students who are compelled to supplement their income by doing various forms of work have been inclined to enter a university located in a large city, where opportunities for securing part-time work are more frequent than in the smaller towns. For example, Tübingen, a famous old university town with 23,000 inhabitants, had about 3,500 students in the summer semester of 1933, but the number had dropped to 2,500 in the summer of 1934. To combat this tendency, the minister of education has issued an order limiting the number of students to be admitted to the universities located in the large cities. The faculties in the large cities may admit only 70 per cent of the registration recorded for the summer semester of 1934. For the University of Berlin (including the newly annexed schools of agriculture and veterinary science) the maximum is 5,600 students; for Munich it is 5,000, Leipzig 3,100, Münster (West-

phalia) 2,500, Cologne 2,300, Hamburg 1,600 and Frankfort-on-Main 1,400. In case all applicants cannot be admitted, preference is given to those students in moderate circumstances who desire to study in their home town, in order to keep down expenses. Foreign students are not included in the maximum number that may be admitted.

The number of women students of medicine in the winter semester 1933-1934 showed a decrease of 22 per cent, as against the registration for the previous winter semester.

For the summer semester of 1932 the number of Jewish medical students was 1,893. For the summer semester of 1933, after the installation in power of the national-socialist party, the registration dropped to 916, and for the winter semester of 1933-1934 to 366, or a reduction of 80 per cent under the registration for the summer semester of 1932. According to private estimates there were no more than 200 Jewish medical students in the summer semester of 1934, and since then the number has doubtless been still further reduced. These figures concern only students who belong to the Jewish faith. No statistics on "non-Aryans" have been reported.

Nothing of importance has been announced in regard to the character of the scholarship of medical students under the new régime, but the report of the chairman of the federal board of examiners in jurisprudence, in which he gives his observations on the results of the 1934 examinations in law, is significant for the formation of an opinion on the character of the scholarship in general. About 88 per cent of the candidates passed, to be sure, the prescribed tests, but there was an evident reduction in the percentage of students whose performances were above the average, or who displayed a high type of scholarship, and a consequent increase in the number of students who secured a barely passing grade. The majority of the candidates may doubtless be said to have lacked the preparation that might be expected of them. It may be presumed that they did not receive adequate instruction.

A survey of the practical operation of the students' work service may be of interest. Of about 13,000 graduates of the secondary schools, who, by reason of the compulsory students' work service (THE JOURNAL, January 12, p. 132), filed requests, this spring, for admission to the labor camps, about 1,000 had to be rejected for the present, because of physical unfitness or because the ranks in the labor camps were already filled. The German student body, in cooperation with the management of the work service, is planning to find employment for the rejected group by organizing work in the rural and the subsistence homestead services.

"The Wonders of Life"—An Exhibit

This year's foremost exhibit, organized by the city of Berlin, is called "The Wonders of Life." The exhibit is organized in accordance with four different aspects: (1) the theory of life, (2) the carriers of life, (3) preservation of life, and (4) life's abodes. The preparation of division 1 was entrusted to the Museum of Hygiene in Dresden. With the aid of ingenious models an attempt is made to explain the functions of the various organs. The relations of the organs to one another are clarified by the well known model of the transparent man, which was designed by the Hygiene-Museum. Other models serve other purposes; for example, the combined area (100 square meters) of the surface of the lungs is given a graphic demonstration by means of a delicate wire network, while another model that contains 32 cubic meters of air serves as an aid in visualizing the amount of air inspired daily. Similar devices are used to illustrate the circulation of the blood and other functions of the body.

In division 2 the family is represented as the center and the carrier, so to speak, of all manifestations of human life; the individual man is put in the background. This hall was constructed by the national-socialist department of public welfare. A set of chimes announces with the rhythmic repetition of its nine strokes that every five minutes nine children are born in the German reich. Many charts of the federal bureau of statistics are displayed; among others, a chart illustrating the mode of organization and the services rendered by the Winterhilfswerk, which organization provides for the needs of persons who are destitute in winter. Also the training of the woman for the duties of the home is represented in form and picture: the training of the young woman for the duties of motherhood and the care of a household and family, including infant care and care of the health of a household. Division 3 is devoted to the preservation of life. The negative side (for example, the combating of venereal diseases) has been studiously placed in the background, the chief emphasis being laid on the positive tasks, such as protection of motherhood, care of a family, or occupational health protection. Division 4, Life's Abodes, was prepared by the federal homestead bureau. A homesteader's simple dwelling in natural size is presented. A detailed demonstration of a so-called subsistence homestead (*siedlung*), including the planting of the garden, is given. The purpose of the homesteading plan is to afford the city dweller, and particularly the laborer, an opportunity to own his own home, together with a garden plot. In this connection, attention is called to the fact that in Berlin there are still 50,000 persons living in unhygienic basement and attic apartments, while approximately 125,000 persons are eking out a miserable existence in their untidy settlements on the outskirts of Berlin.

ITALY

(From Our Regular Correspondent)

March 31, 1935.

The Prevention of Blindness

Professor Federici, the new director of the Clinica oculistica of Bari, gave recently his introductory lecture, in which he illustrated the modern methods for the prevention of blindness. Trachoma, conjunctivitis purulenta neonatorum, syphilis and tuberculosis are the chief causes of blindness. Trachoma is widely diffused in Italy, particularly in the southern provinces and in the islands in which the population is more dense. Trachoma must be regarded as an infectious and contagious disease, although the etiologic agent is not known. The central government and other public bodies have established free dispensaries, amounting in number to 312. In southern Italy alone, about 100,000 trachomatous persons each year receive treatment. The patients who present the gravest symptoms are hospitalized. In the schools the trachomatous children are isolated. The general progress of recent years, including more hygienic dwellings, better drainage, the founding of schools and colonies, and the construction of aqueducts, has rendered great aid. Conjunctivitis purulenta blennorrhagica neonatorum also is usually a reflection of poverty and ignorance. The number of persons who have become blind because of this disease is today much diminished, because of the wide diffusion of dispensaries to combat venereal diseases, which are aided by the central government. In the same manner, effective results have been secured in combating syphilis.

The crusade against tuberculosis in Italy is nation wide and is accomplished through the creation of dispensaries. Aside from the fact that the mortality from tuberculosis has been notably reduced (the total annual number of deaths from tuberculosis has dropped from 65,000 to 35,000), there has been also an evident reduction of blindness due to tuberculosis of the eye.

The Medicosurgical Society of Padua

The Società medico-chirurgica di Padova met recently under the chairmanship of Professor Truffi. Frontali spoke on the hemolytic factor in the splenic anemia of infants. In eleven cases he observed that the disease developed almost silently between the sixth and the twelfth month of life, with waxen pallor associated with skeletal changes of a rachitic type. The blood

picture showed reduction of the red corpuscles and the hemoglobin, and increase of the white corpuscles. There was also erythroblastosis, with some microcytosis. The hemoglobin exchange revealed a hyperhemolysis and bilirubinemia, with an indirect positive van den Bergh reaction. The corpuscular resistance was normal. Frontali assigns importance to a hemolytic factor in the genesis of splenic anemia, even if the corpuscular resistance is not diminished.

Belloni and Zoldan spoke on optic atrophy in tabes, with binasal hemianopia, and presented a case that appeared to be the thirteenth described in the literature. The increase in the pressure of the cerebrospinal fluid caused the speakers to take account of the theory of Walker and Cushing with respect to the genesis of hemianopia as a result of hydrops of the third ventricle, but they reached the conclusion that the theory was not applicable to their case.

Frontali and Rasi dealt with familial hemorrhagic icterus, with erythroblastosis and with increased corpuscular resistance. In two brothers, one aged 7½ and the other 9 years, the speakers observed pallor from the first year of life, and a slight icterus in the older child, which became exacerbated under the influence of intercurrent infectious diseases. Both children presented hepatomegaly and splenomegaly, oligocythemia, erythroblastosis, oligochromemia, increased corpuscular resistance and increased hemoglobin exchange. The speakers tested the resistance of the red corpuscles of the two patients as compared with the plasma of healthy subjects belonging to the same blood group.

This last test furnished evidence of a diminished resistance of the healthy red corpuscles when they are measured in contact with the plasma of the patients. Research to discover in what part of the plasma the substance that favors the hemolysis is found has shown that the ultrafiltrate that contains the crystalloids of the plasma exerts also the hemolyzing influence, whereas this is not observed in the colloidal portion that remains above the filtrate. The speakers concluded that splenic anemia of infants may assume, by imperceptible degrees, the characteristics of familial hemolytic icterus, either with normal or with increased corpuscular resistance.

Medical Aid for the War Injured

In a recent announcement, the Opera nazionale per la protezione ed assistenza agli invalidi di guerra stated the conditions governing medical aid to disabled persons, to their orphans and to their children, until they reach the age of 15, and, in exceptional cases, until they are 18 years old.

Admission to a hospital will be granted to disabled persons only in case the present condition has a direct relation to the wounds and diseases for which they obtained a pension. The admission, if it is not of an urgent character, must be authorized by the Opera, which will not grant it in cases adjudged chronic or incurable. The president of the Opera has created a central bureau for consultation. The treatment of tuberculosis and pretuberculous conditions in the children of the disabled will be turned over to the provincial antituberculosis societies or to the Opera nazionale per la protezione della maternità e infanzia. For adenoidectomies and tonsillectomies, authorization must be secured from the headquarters of the society. Balneothermal treatment for disabled persons and their families has been abolished. Disabled persons affected with sequels of epidemic encephalitis may be admitted to a clinic or specialized institute for a maximal period of three months.

Personals

Prof. Luigi Torraca, ordinarius in surgical pathology, has been called to succeed Pascale Giacomo, senator, to the chair of clinical surgery at the University of Naples.

Prof. Paolo Gaifami has been appointed director of the obstetric-gynecologic clinic of the University of Rome, to fill the vacancy caused by the death of Professor Pestalozza.

VIENNA

(From Our Regular Correspondent)

March 20, 1935.

Survey of Laryngeal Cancer in the Hajek Clinic

Professor Dr. Hajek delivered recently, before the Vienna Laryngologic Society, an address on laryngeal cancer. During the fifteen years (1919-1934) that he served as director of the Vienna Laryngorhinologic Clinic, 393 cases came to operation. He emphasized that, during the first part of his work, health conditions among the population, owing to after-effects of the war, were bad. The patients who came to the clinic were weakened, and their teeth were frequently carious. When they applied for treatment, the disease was in an advanced stage. With regard to the indications for laryngofissure, one had to go much further than had been the custom, because many patients refused to submit to the more extensive, radical operation. Patients above the age of 70, in whom the disease had not progressed so far as in the younger patients, were scarcely ever subjected to the operation. In seventy-nine of the 393 cases, laryngofissure was applied, and in 256 cases (fifteen women) lateral pharyngotomy was employed. This was a real opportunity of obtaining a survey of the operability of laryngeal cancer. Of the seventy-nine patients operated on by laryngofissure, 15 per cent died postoperatively, within twenty days; 32 per cent died within three years, and 40 per cent remained well for from three to ten years. Of those who died within three years, 40 per cent succumbed to a recurrence; 40 per cent had to submit to a second operation (this time total extirpation), and 10 per cent died from intercurrent diseases. In the group that remained well for from three to ten years, 11 per cent lived from three to five years, 54 per cent ten years, and 34 per cent more than ten years after the operation. Of the cases in which the operation was plainly indicated, not one showed a recurrence within three years. Of the cases with mild, extended indications, however, 36 per cent presented recurrences. Total extirpation was carried out in 279 cases, in eighty-nine of which the tumor had not yet gone beyond the region of the larynx. The tabulation shows the distribution of cases in men according to age groups.

Age groups.....	30-40 Years	40-50 Years	50-60 Years	60-70 Years	70-80 Years	Total, 241 cases
No. of cases....	7	52	102	74	6	

Of the eighty-nine patients with cancer limited to the larynx, 19 per cent died postoperatively (within twenty days); 32 per cent remained well for three years, 22 per cent of these developing recurrences, and 34 per cent remained well more than three years (with 4 per cent of recurrences); a few more than ten years. Of the 152 patients with cancer in and beyond the larynx, 25 per cent died postoperatively and 48 per cent remained well for three years, with 38 per cent developing recurrences, and 17 per cent remained well more than three years, with only 1.3 per cent of recurrences within three to ten years. It is evident, therefore, that total extirpation of cancer, if the patient remains well for three years, gives good results. Even in the especially malignant cases, in which, however, a complete operation with total elimination of glands could be performed, it was found that glandular complications need not be regarded as an absolute contraindication to the radical operation. Thirty per cent of such patients died postoperatively, but 15 per cent survived the five-year period. It is true that carcinomas of the larynx have been treated with radium and with x-rays, but this study is concerned solely with operative therapy. In regard to the ray treatment, no final judgment can be rendered as yet. Hajek reported his observations also in cases in which ligation of the common carotid was required. Of the eight patients subjected to this intervention, four died from the effects and four survived. In addition to seventy-nine laryngofissures and 279 total extirpations, there were forty-three cases

that necessitated an incomplete operation. The pathologic changes were so extensive that the radical operation was impossible. The operative results were of course poor. Such cases belong rather to the field of ray treatment. In summing up, Hajek emphasized that the radical operation in cancer of the larynx, when performed by an experienced surgeon, offers favorable changes for recovery. It should be added that, if suitable speech training is applied, it is possible, even in total resection of the larynx, to develop in the patient a usable speaking voice, as Prof. H. Stern in the same clinic has repeatedly demonstrated.

The Sesquicentennial of the Vienna General Hospital

In May the sesquicentennial anniversary of the famous Vienna General Hospital will be celebrated in a ceremonial manner. All the physicians of the world who received their training in the clinics of this hospital have been invited to participate in the festivities. A large influx of physicians from Europe and overseas is expected. Up to the World War, the Vienna General Hospital was one of the most important centers of medical education in the world—a veritable mecca of physicians. Its foundation goes back to the time of Emperor Joseph II, who was considered the founder of democracy in central Europe and the most liberal and advanced ruler of his day. In 1784 he laid the corner-stone of the building, which he dedicated "zum Wohle und zum Heile des Volkes," as the original inscription over the entrance gate still reads. The celebration should have been held last year, but because of political disturbances it had to be postponed. The hospital in its extent and in its arrangement has remained almost exactly as it was 150 years ago. An architectural feature is the so-called Narrenturm, a circular structure that was originally intended for mental patients—as far back as 1815, but which now is used only as a dormitory and for administration purposes. The circular arrangement of the "cells," as in modern prisons, facilitated the supervision of the mental patients, for at that time no attempts to treat mental patients were made. The "old" general hospital comprises 1,800 beds, but in case of need the capacity can be increased to 2,400. It is closely connected with the new general hospital, which houses chiefly the clinics, which were constructed thirty years ago and elaborately, even extravagantly, equipped in the most modern manner. Likewise the old hospital, which in its external form presents the same original appearance, has been transformed in its interior, including the laboratories and scientific institutes, into a thoroughly modern, first-class institution.

Prof. Dr. Norbert Ortner

The internist Prof. Dr. Norbert Ortner died recently, at the age of 70, from bulbar paralysis, from which he had suffered for years. He began his career as pathologic anatomist at the institute of Professor Weichselbaum but later turned his attention to internal medicine and became the assistant of Professor Neusser. He afterward removed to Innsbruck as professor of internal medicine. His first research was concerned with the pathology of the blood and the circulatory apparatus. His most important works are "Treatment of Internal Diseases," which has been translated into many languages, and his book on "Pain." Since 1911 he had been the director of the second medical clinic in the general hospital in Vienna and had played an important part in training a large number of the prominent clinicians in Austria and Germany. His private practice was enormous, his advice being much sought by foreigners. He was physician to the aged emperor Francis Joseph until the latter's death. Three years ago, Ortner was compelled to give up his medical practice. Professor Dr. Jagić succeeded him in the direction of the clinic.

RIO DE JANEIRO

(From Our Regular Correspondent)

March 15, 1935.

Ticks as Transmitters of Typhus

Dr. Toledo Puza recently lectured before the Sociedade de Biologia of São Paulo on the rôle of ticks in transmission of typhus. He observed outbreaks of exanthematous typhus in rural areas in São Paulo in persons without either head lice or body lice, in whom the disease was related to the bite of ticks. Patients frequently enter the hospital with ticks still adherent to the skin. A woman who for the first time in her life was in a rural district was bitten by a tick. She showed an exanthematous patch around the bite and later developed typhus. Another patient developed typhus one day after his infestation with ticks, showing that the period of incubation in man may be short. The parasites were still adherent to the skin of this patient. These cases are equivalent to experiments on human beings. Dr. F. Lemos Monteiro succeeded in transmitting typhus from infected to normal guinea-pigs by feeding ticks first on the infected and then on the normal animals. He found out that the capacity to infect is transmitted to the eggs and larvae of ticks. Dr. Luis Salles Gomes produced experimental typhus in guinea-pigs by inoculating them with ticks captured near the homes of typhous patients. The clinical observations of the speakers confirming experimental work previously reported indicate that ticks are a common transmitting agent of exanthematous typhus. The prevention of typhus in São Paulo is difficult because of the abundance of ticks in rural areas.

Serology of Leprosy

Drs. O. G. Bier and Kate Arnold, in a lecture before the Sociedade de Biologia of São Paulo, reported their studies on the specificity of the Rubino test in leprosy. They examined 327 samples of serums. The proportion of positive tests in the different forms of leprosy was as follows: pure nervous leprosy, 29.4 per cent; maculo-anesthetic leprosy, 41.7 per cent; mixed form, 56.5 per cent; tubercular form, 66.6 per cent; incipient cases, 13.8 per cent. Only one positive test was obtained from the study of 945 control serums. In mixed forms, the specificity of the test varies with the intensity of the cutaneous symptoms without any apparent relation to the nervous component. These studies confirm the statements of Rubino, Marchoux and Caro on the necessity of electrolytes for the agglutination and on the exclusive absorption of leprosy agglutinins by a suspension of globules in formaldehyde.

Changes in Finger Prints of Lepers

Dr. Leonidio Ribeiro has published articles on the changes that leprosy causes on the designs in finger prints of lepers. He has made studies on this subject in the hospitals of the colony for lepers in Curupaity, Jacarépaguá, Rio de Janeiro. The author says that Locard observed white streaks in the finger prints of normal persons in 10 per cent of the cases. Ribeiro found white lines in the finger prints of lepers in 70 per cent of the cases. He concludes that leprosy causes marked changes in the designs of the finger prints.

Typing of Blood of Indians

Drs. Leonidio Ribeiro, W. Berardinelli and M. Roiter recently made determinations of the blood groups in 100 Guarani Indians of Colonia em Missões, Rio Grande do Sul. In all of them the blood group was of the O type. Snyder observed that 91.3 per cent of pure American Indians belonged to the O type. Vela found 95.5 per cent of Ecuadorian Indians of the O type. The authors pointed out the ethno-anthropological importance of the subject and emphasized the fact that there is a predominance of the group of the O type among pure Indians living in isolated colonies.

Marriages

JUNIUS ALBION GILES JR., Chapel Hill, N. C., to Mrs. Mary Tatnall Warner Carpenter of Wilmington, Del., May 24.

ROBERT KEMP WILSON, Providence, R. I., to Miss Louise Margaret Nelson of Fall River, Mass, June 3.

WINFIELD SCOTT FARMER, Nashville, Tenn., to Miss Ollie McGinness of Carthage, at Sparta, May 4.

RUSKIN GREGORY ANDERSON, Spartanburg, S. C., to Miss Corryne Haskell in Atlanta, Ga., May 25.

TRYGGVE ALEXANDER HAGERUP, Dodgeville, Wis., to Miss Ingrie Holmboe of Chicago, May 4.

JOHN ALFRED MOFFITT to Miss Lila Lee Brown, both of Oklahoma City, at Tulsa, May 5.

CARL VANN TYNER, Leakesville, N. C., to Miss Charlotte Brown of Chapel Hill, June 2.

SOLOMON J. TUREL, New York, to Miss Rose Lillian Albert of Newark, N. J., June 2.

ANDREW F. BULFER, Chicago, to Miss Julia Sawyer of DuQuoin, Ill., April 24.

RICHARD B. EASLEY, Huntington, W. Va., to Miss Mary F. Kellam, April 30.

Deaths

Philip William Nathan ✠ New York; University of the City of New York Medical Department, 1893; member of the American Orthopedic Association and fellow of the American College of Surgeons; at one time clinical professor of orthopedic surgery, University and Bellevue Hospital Medical College; veteran of the Spanish-American and World wars; aged 62; at various times on the staffs of the New York Society for the Relief of the Ruptured and Crippled, Beth Israel Hospital, New York Infirmary for Women and Children, Montefiore Hospital for Chronic Diseases and the Mount Sinai Hospital, where he died, April 20, of carcinoma of the pancreas.

John Earl Else, Portland, Ore.; Northwestern University Medical School, Chicago, 1905; member of the Orgeon State Medical Society, the North Pacific Surgical Association and the Pacific Coast Surgical Association; past president of the Pacific Northwest Medical Association and the Portland Academy of Medicine; fellow of the American College of Surgeons; emeritus professor of surgery, University of Oregon Medical School; formerly chief of the surgical service of the Multnomah County Hospital and the Doernbecher Memorial Hospital for Children; aged 56; died, May 3, of cardiovascular renal disease.

Frank Dyer Sanger, Ruxton, Md.; College of Physicians and Surgeons, Baltimore, 1888; member of the Medical and Chirurgical Faculty of Maryland; professor emeritus of rhinology and laryngology, University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore; fellow of the American College of Surgeons; consulting laryngologist to the Mercy, Sydenham, Bay View, Bon Secours and Union Memorial hospitals, the Church Home and Infirmary and the Hospital for Women, Baltimore; aged 70; died, May 15.

Robert Carroll Howard ✠ New York; Cornell University Medical College, New York, 1911; clinical professor of otology, New York Polyclinic Medical School and Hospital; member of the American Laryngological, Rhinological and Otological Society; fellow of the American College of Surgeons; associate attending otologist to the New York Polyclinic Medical School and Hospital, consulting otolaryngologist to St. Elizabeth's Hospital, aged 51; was found dead, May 5, of angina pectoris.

Edward Arthur Parker, Brooklyn; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1890; member of the Medical Society of the State of New York; at various times on the staffs of the Williamsburgh Maternity Hospital, St. Mary's Hospital and the Brooklyn Eye and Ear Hospital; aged 66; died, May 17, of coronary thrombosis.

Mark Jampolis ✠ Chicago; Northwestern University Medical School, Chicago, 1906; member of the American Academy of Pediatrics; associate in pediatrics at his alma mater; aged 53; on the staffs of the Sarah Morris Hospital for Children, the La Rabida Sanitarium and the Michael Reese Hospital, where he died, May 19, of mesenteric thrombosis.

Marion Sparehawk Jordan ✠ Clinton, Iowa; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1901; past president and secretary of the Clinton County Medical Society; on the staff of the Jane Lamb Memorial Hospital; aged 68; was found dead in bed, April 30, of coronary heart disease.

Donald J. O'Connor, Appleton, Wis.; Detroit College of Medicine, 1897; during the World War was a member of the Volunteer Service Corps; chief surgeon and consultant of the U. S. Public Health Service; for many years on the staff of St. Elizabeth Hospital; aged 60; died, May 4, of myocarditis and coronary thrombosis.

Daniel Joseph McCarthy, Bridgeport, Conn.; College of Physicians and Surgeons, Baltimore, 1906; member of the Connecticut State Medical Society; fellow of the American College of Surgeons; aged 52; on the staff of St. Vincent's Hospital, where he died, April 23, of lobar pneumonia, chronic endocarditis and gastric ulcer.

Cornelius A. M. Dorrestein ✠ New Orleans; Tulane University of Louisiana Medical Department, New Orleans, 1897; senior chief of the gynecological staff, Touro Infirmary, and chairman of the Radium Institute; on the staff of the Charity Hospital; aged 61; died, April 16, of heart disease.

George Harris Searcy, Tuscaloosa, Ala.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1901; member of the Medical Association of the State of Alabama; aged 58; died, May 6, in the Veterans Administration Facility, of hemorrhagic meningoencephalitis.

Edward Jones Wannamaker, Orangeburg, S. C.; University of the City of New York Medical Department, 1888; member of the South Carolina Medical Association; veteran of the Spanish-American War; aged 68; died, May 7, in a hospital at Charleston, of chronic myocarditis.

Edmund James Boardman, Winnipeg, Manit, Canada; Manitoba Medical College, Winnipeg, 1907; assistant professor of clinical surgery (urology) at his alma mater; past president of the Manitoba Medical Association; aged 57; died, May 12, in Saskatoon, Sask., of angina pectoris.

Frank White, Philadelphia; Jefferson Medical College of Philadelphia, 1891; member of the Medical Society of the State of Pennsylvania; formerly on the staff of the American Hospital for Diseases of the Stomach; aged 64; died, March 27, of heart disease.

Harold Mark Akey, Merrill, Wis.; Marquette University School of Medicine, Milwaukee, 1932; member of the State Medical Society of Wisconsin; aged 27; on the staff of the Holy Cross Hospital, where he died, April 30, of cerebral hemorrhage.

Henry William Dueringer ✠ Oak Park, Ill.; Chicago Homeopathic Medical College, 1896; served during the World War; at one time on the staffs of St. Joseph's and Sherman hospitals, Elgin; aged 66; died, May 20, of chronic myocarditis.

Albert Harter Lane ✠ Dayton, Ohio; Louisville (Ky.) Medical College, 1894; past president of the Montgomery County Medical Society; formerly health commissioner of Dayton; aged 77; died, May 5, of cerebral hemorrhage.

David Dale ✠ Bellefonte, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1904; served during the World War; on the staff of the Centre County Hospital; aged 59; died, April 22, of cerebral hemorrhage.

John C. Joiner, Honey Grove, Texas; University of Louisville (Ky.) School of Medicine, 1892; member of the State Medical Association of Texas; health officer of Honey Grove; aged 65; died, April 20, of hemiplegia.

Frederick Foster Dowds, Mount Vernon, Ohio; Western Reserve University Medical Department, Cleveland, 1912; member of the Ohio State Medical Association; aged 52; died, April 30, of cerebral hemorrhage.

Albert Leroy Doe, Long Beach, Calif.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1904; aged 54; died, March 31, of cerebral hemorrhage and arteriosclerosis.

Reginald Arthur Yeld, Edgewood, B. C., Canada; M.B., in 1898, University of Cambridge Faculty of Medicine, Cambridge, England, and M.D., in 1901; aged 61; died, April 3, of lobar pneumonia and influenza.

Howard Elmer Campbell ✠ Anita, Iowa; University of the City of New York Medical Department, 1891; past president of the Cass County Medical Society; aged 71; died, April 23, of aplastic anemia.

John McGuire, Staten Island, N. Y.; College of Physicians and Surgeons of Chicago, 1890; aged 74; died, April 9, in the Sailor's Snug Harbor Hospital, of cerebral thrombosis and chronic myocarditis.

James W. Fox, Hillsdale, N. J.; New York Homeopathic Medical College and Hospital, New York, 1904; member of the Medical Society of New Jersey; aged 62; died, May 2, of diabetes mellitus.

Vivian Salisbury Way Worden, Saranac Lake, N. Y.; Syracuse University College of Medicine, 1919; member of the American Psychiatric Association; aged 43; died, May 7, of heart disease.

Edward Thomas Kelty, Tiptonville, Tenn.; University of Nashville Medical Department, 1900; member of the Tennessee State Medical Association; aged 61; died, March 30, of heart disease.

Fern A. Rice, Delavan, Wis.; Bennett College of Eclectic Medicine and Surgery, Chicago, 1889; for many years city health officer; aged 66; died, April 22, of heart disease.

Della Priscilla Pierce, Kalamazoo, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1890; aged 81; died, May 9, of arteriosclerosis.

Howard Wallace Stuch, Allegan, Mich.; University of Virginia Department of Medicine, Charlottesville, 1901; aged 58; died, April 26, of organic heart disease.

Harris Taylor Collier, McKenzie, Tenn.; Tulane University of Louisiana Medical Department, New Orleans, 1900; aged 58; died, May 4, of cerebral hemorrhage.

Daniel D. O'Gorman, St. Louis; Trinity Medical College, Toronto, Ont., Canada, 1888; aged 70; died, April 27, in St. John's Hospital, of coronary thrombosis.

Charles A. Sellers ✠ Hartford City, Ind.; Fort Wayne College of Medicine, 1904; aged 60; died, April 27, of chronic nephritis, hypertension and cerebral edema.

Roger Eustace Bousfield, Ellsworth, Maine; Boston University School of Medicine, 1931; aged 33; died, March 20, of diabetes mellitus and chronic myocarditis.

William Cathey Harkey, Lenexa, Kan.; University Medical College of Kansas City (Mo.), 1900; aged 63; died, February 7, of carcinoma of the stomach.

William Harvey DeKay, Hurleyville, N. Y.; University of Buffalo School of Medicine, 1875; aged 86; died, March 31, of angina pectoris and arteriosclerosis.

Luther Walton White, San Antonio, Texas; University of Arkansas School of Medicine, Little Rock, 1909; aged 52; died, March 9, of cerebral hemorrhage.

Rollen Lemuel Shinaberry, Scranton, Pa.; Jefferson Medical College of Philadelphia, 1910; aged 47; died suddenly, May 17, of heart disease.

Grafton D. Whitaker, Kansas City, Kan.; Cincinnati College of Medicine and Surgery, 1870; aged 85; died, April 4, of coronary thrombosis.

Harry Aloysius Doherty, Atlantic City, N. J.; Jefferson Medical College of Philadelphia, 1906; aged 62; died, April 14, of coronary occlusion.

George Henry Ramsey, Victoria, B. C., Canada; University of Toronto (Ont.) Faculty of Medicine, 1899; aged 71; died, February 22.

Samuel Pool, Leakesville, Miss. (licensed in Mississippi in 1901); formerly county health officer; aged 78; died, April 13, of hepatic disease.

George Willford Wood, Wilmington, Ohio; Homeopathic Hospital College, Cleveland, 1886; aged 78; died, April 1, of pneumonia.

Alburton Alonzo Dewey, Bristol, Conn.; Eclectic Medical Institute, Cincinnati, 1906; aged 60; died, March 16, of coronary occlusion.

Rephaniah Neville, Mishawaka, Ind. (licensed in Indiana in 1897); Civil War veteran; aged 88; died, April 5, of arteriosclerosis.

Milton V. Dewire ✠ Sharon, Wis.; Rush Medical College, Chicago, 1894; aged 67; died, May 6, of myocarditis and arteriosclerosis.

Daniel V. Ray, Rossville, Ill.; College of Physicians and Surgeons, Keokuk, Iowa, 1892; aged 69; died, April 9, of heart disease.

Edwin Coleman Brown, Boston; College of Physicians and Surgeons, Boston, 1894; aged 65; died, April 28, of heart disease.

Burch C. West, Richburg, N. Y.; University of Pennsylvania Department of Medicine, Philadelphia, 1906; aged 55; died, March 22, of colitis.

Ham S. Hampton, Tampa, Fla.; Hospital Medical College, Atlanta, Ga., 1910; aged 47; died, March 31, of pneumonia.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

NORMAL BLOOD PRESSURE

To the Editor:—If convenient, please answer the following question: Which is the more correct generalization: that the normal blood pressure reading should be 100 mm. plus the age of the individual, or that it should be 90 mm. plus the age of the individual?

JOHN H. PREWITT (third year student), Lexington, Ky.

ANSWER.—Although the generalizations cited have been popular for many years, neither is correct. What is considered normal is, after all, merely the mean or average of the readings in presumably healthy persons. Thus, as with other "normal" measurements, such as height or weight, the normal falls within a range and is not a single set figure. Age is by no means the only physiologic factor that causes variation of the normal arterial tension; physique, sex, race and climate are persistent factors, and emotions, physical activity, fever, anesthesia, environmental temperature and posture affect the arterial tension transiently without necessarily passing beyond normal limits. The systolic tension is far more labile and variable than the diastolic tension; thus, standards of normality are better fixed by the diastolic than by the systolic pressure.

The average or mean readings for the systolic tension do not increase as rapidly as age. Thus any such rule as mentioned in the query will prove unsatisfactory. The most extensive and accurately determined averages of normal are those prepared for and by life insurance underwriters. The following table reveals the normal averages for white males in the United States; the normal range should include readings 10 mm. in either direction than these averages for the systolic tension and 5 mm. higher and 10 mm. lower than the mean for the diastolic tension.

Average Normal Arterial Tension, in Relation to Age, in White Males

Age	Systolic	Diastolic
20	120	79
25	121	80
30	122	81
35	123	82
40	125	83
45	127	84
50	129	85
55	131	86
60	134	87
65	138	89

It is notable that with advancing years the average normal systolic tension increased more rapidly than the diastolic pressure, but much more slowly than the age. The normal pulse pressure increases from 41 mm. at 20 years to 49 mm. at 65 years.

If a reasonably accurate simple generalization is desired, the following rule is justified: In normal adults the normal range of the blood pressure is 110-148/70-95, approaching the upper limits in the older age groups. An arterial tension over 150 systolic and/or 100 diastolic is abnormally high. Isolated observations of hypertension, however, do not constitute valid evidence of hypertensive disease because of the many physiologic variables that may alter the tension temporarily.

CONTAGIOUSNESS OF SYPHILIS

To the Editor:—A patient came to me recently with a tertiary syphilitic cutaneous lesion. The history is vague concerning any initial lesion. Treatment consisted of six courses of arsenic acid and a heavy metal with iodides over a period of two years. The patient is a woman, beyond the menopause—free from any evidence of syphilis at present—beyond a positive Wassermann, the cutaneous lesions having disappeared. The spinal fluid is completely negative. Is it permissible for the patient to marry, which she desires, or to have intercourse, if she is free of any contagious lesion? Kindly omit name. M.D., New York.

ANSWER.—It is not clear exactly what is meant by "six courses of arsenic acid." Supposing that this is one of the effective arsphenamines, both the stage of the patient's infection and the treatment given provide as much assurance as there is that she is noninfectious and may marry or have intercourse without the likelihood of transmitting the disease. Absolute and unqualified statements on such a matter while the Wassermann test of the patient's blood is positive cannot be made, and the marital or sexual partner may properly expect to be made acquainted with the situation however remote the risk.

MASTURBATION IN GIRLS

To the Editor:—A girl, aged 8 years (whose parents are of middle class and sufficiently intelligent to deplore her affliction), has practiced masturbation since the age of 1 year (according to the mother). As near as I can ascertain, four operations have been performed at various times between 14 months of age and a year ago for what I judge has been separation of the prepuce from the clitoris, especially since, on examination, there is considerable scarring in that area, with the clitoris completely bound down and out of possible vision. No operative procedure has ever given results. Up to three months ago the child was a constant leader in her school work. At that time, and for the first time, she had started her practices in the schoolroom, until it was necessary to remove her from school. Also at that time her grades in school started on a gradual decline, and she has gradually developed a facial expression approaching mild idiocy. She is entirely cooperative at home in attempting to help correct the habit, allowing the mother to tie her hands to the bedposts at night without complaint or remonstrance. This was done by the latter as a last desperate measure to correct the condition. The mother also states that an orgasm takes place, as a condition of rigidity and muscular spasm terminates the act. Any information as to treatment and prognosis that I may pass on to these parents will be greatly appreciated. Intestinal parasites as a causative agent have been excluded. Please omit name and town if published.

M.D., Nebraska.

ANSWER.—Masturbation in infants and young girls is generally started by some local irritation and, when this irritation has been removed before the habit has become definitely fixed, the habit will be as a rule abandoned. The longer one waits, however, the more fixed the habit becomes, the child notes the pleasurable sensation accompanying the act, and the more difficult it is to cure it. In this case it was certainly not good treatment to perform a series of operations on the genitals, as this procedure more definitely fixes the attention of the child on the genital organs. Whatever treatment is adopted, the most important thing to remember is to divert the child's attention from these organs. For this reason all restraining apparatus should be avoided, as these constantly keep the child's attention fixed on the habit. At school or in the gymnasium any exercises that tend to produce friction on the parts should be avoided, such as sliding down a pole or sliding on a banister. In doing this, however, the child should not be told to avoid these exercises, but it should be so arranged that she does not get them. In other words, nothing should be said or done that directs the child's attention to the habit. Spanking must be avoided, as in some children this act arouses erotic sensations.

It would be well, if possible, to avoid all reference to the condition, even if the parents know that the child is masturbating. One should not let the child know that she is being watched. She should avoid tea and coffee and, of course, alcoholic beverages. She must avoid all sensual movies without, however, knowing that this is done on purpose. For a short time the internal administration of bromides in proper doses is of value, but the most important measure is to replace some other activity for the masturbation. Any outdoor hobby, such as swimming, golfing or tennis, is of value. Nothing is so good as hard work so as to keep the child occupied. Any inclination of the child to be by herself should be tactfully discouraged. In the vast majority of cases the foregoing outline will cure the child. Should the psychic element be found to predominate, psychoanalysis by an expert medical psychoanalyst would be in order.

TRAUMA AND HERNIA

To the Editor:—I have a patient who was struck by an automobile and rendered unconscious for eight hours; surface injuries were trivial. He emerged from the accident, however, with bilateral, direct inguinal hernias—rather large abdominal openings—more like a splitting open of the inguinal canals. He is positive he had no hernia before. Can a person receive *bilateral* hernias from a trauma like this? Are there any cases in the literature? Where can I get further information on this subject? If published, please use initials. M.D., New York.

ANSWER.—J. J. Moorhead (Traumatic Surgery, ed. 2, Philadelphia, W. B. Saunders Company; Relation of Trauma to Hernia, *New England J. Med.* **209**:568 [Sept. 21] 1933) states that trauma alone is the rarest cause of hernia and that they are never bilateral. Bull and Coley (quoted by Moorhead) investigated the alleged relation of injury to hernia in 10,000 cases and they regarded two as due to direct violence. C. D. Selby (Direct Abdominal Hernia of Traumatic Origin, THE JOURNAL, Nov. 3, 1906, p. 1495) reported a case of direct hernia following a direct injury. Operation disclosed a tear in the external oblique fascia, the internal oblique and the transversalis muscles.

Direct hernia, which occurs only from 3 to 5 per cent as frequently as the indirect type, is more likely to be due to trauma (Moorhead).

Watson (Hernia, St. Louis, C. V. Mosby Company, pp. 603-613) gives a good review of the compensation boards. In some courts proof must be furnished that the hernia did not exist prior to the accident in a claim for traumatic hernia. However, some compensation boards rule that when a strain causes protrusion of the bowels it is a compensable injury even though the protrusion is at a point weakened by congenital malformation or preexisting hernia.

Gorton (Compensable Hernia, *J. Indiana M. A.* **23**:521 [Nov.] 1930) states that if a hernia develops as an incident to the man's daily work it should be considered a result of a special anatomic weakness for which the company is in no way responsible. He considers that industrial accidents of various sorts, usually lifting or straining, are regarded more frequently as the cause of hernia than the facts warrant, but that many of these industrial accidents are the exciting cause.

The consensus is that there is a preformed sac or a congenital weakness in almost all cases.

A number of factors must be considered in determining what relation, if any, an accident bears to the development or aggravation of a hernia. These are the history of the accident, the time intervening, the location and extent of the trauma, the type and degree of hernia, and the evidence of local injury.

There is enlargement of the external abdominal ring in 2.2 per cent of men, according to the surgeon general's report from the examination of 2,000,000 drafted men. Erdman (Nelson Loose-Leaf Surgery, New York, Thomas Nelson & Sons **4**:610) thinks that this enlargement may be an important determining factor in the occurrence of primary direct hernia.

The following references will give further information:

St. Jacques, Edmond: Accidental Hernias and Their Compensation, *Canad. M. A. J.* **22**: 661 (May) 1930.
Holland, J. H.: *New England J. Med.* **209**: 579 (Sept. 21) 1933.

CORD BLADDER—CHRONIC CYSTITIS

To the Editor:—1. What is string or cord bladder? How can I get information about care and treatment? 2. In cases of chronic cystitis coming on after prostatectomy and having a duration of some years, what would be the probable changes leading to death? Can I get advice as to treatment? 3. Mountain Valley water from Hot Springs, Ark., is advertised to neutralize acids that cause irritation. Would this be better than sodium carbonate? 4. One good textbook advises potassium chlorate, also a milk diet. My experience with milk is that it causes retention and pain and has to be dropped. Can I get an opinion as to these two substances?

EVERETT FLOOD, M.D., Friendship, Maine.

ANSWER.—1. So-called cord bladder is a condition caused by paralysis of the nerves supplying the bladder and is characterized by an atonic condition of the detrusor muscles, a variable degree of residual urine, and relaxation of the internal sphincter and prostatic urethra. There is a great difference in treatment of the bladder that is completely paralyzed, as frequently occurs with severe spinal trauma, or only partially, as is often observed with various types of disease involving the spinal cord. Employment of catheter drainage is contraindicated in the former group but is usually advisable in the latter.

A number of articles have been written in regard to the treatment of cord bladder, among which may be mentioned:

Cumming, R. E.: Bladder Paralysis: Etiology, Prognosis and Treatment, *J. Michigan M. Soc.* **28**: 5 (Jan.) 1929.
Braasch, W. F.: Data with Regard to Lesions of the Nerves of the Urinary Tract, *J. Urol.* **13**: 383 (April) 1925.
Caulk, J. R., and Greditzer, H. G.: Observations on the Bladder in Diseases of the Central Nervous System, *Am. J. Syph.* **1**: 42 (Jan.) 1917.
Corbus, B. C., and O'Conor, V. J.: Tabetic Bladder from the Standpoint of the Urologist, THE JOURNAL, Nov. 18, 1922, p. 1750.
Braasch, W. F., and Thompson, G. J.: Treatment of the Atonic Bladder, *Surg., Gynec. & Obst.*, to be published.

2. Chronic cystitis persisting after prostatectomy is often secondary to renal infection, although in many cases it results from a persisting infection in that portion of the prostatic urethra from which the prostate has been enucleated. Although the symptoms of such infection may be trying, it is seldom that it is a major factor in causing a patient's death. However, in case of severe increasing infection leading to pyonephrosis, fatal complications may follow, although this occurs in only a small percentage of cases. The treatment of postoperative cystitis should consist of first determining the type of infection. If bacilluria is present, it can be overcome frequently by the ketogenic diet, together with acidification of the urine by some drug such as ammonium chloride or ammonium nitrate. Topical applications to the prostatic urethra and lavage of the bladder with solutions of potassium permanganate, acriflavine, or weak Goulay's solution will be of value in many cases.

3. It is a common fallacy that the reaction of the urine with chronic cystitis is acid and that this is the cause of irritation. Symptoms are almost always due to an inflammatory condition of the mucosa and not to any variation in the degree of acidity of the urine. If alkalization of the urine causes subjective relief,

it is best accomplished by means of some drug such as sodium bicarbonate rather than by attempting to bring it about with any type of water.

4. It is open to question whether any drug or milk diet will be of much benefit in chronic infections of the bladder. The best methods of treatment are those described above.

ALLERGIC REACTION FROM TOXOID

To the Editor:—In an answer to a recent query (THE JOURNAL, January 5, p. 68) concerning the probable relationship between an allergic reaction resulting from the administration of alum precipitated toxoid and a previous inoculation with pertussis vaccine, it is inferred that the patient was sensitized by the vaccine. Further, it is assumed that the blood proteins (probably other than those of human blood, although this fact is not definitely established) which may have been contained in the vaccine were the responsible antigenic substances. In order to explain the allergic response which is believed to have resulted from the subsequent injection of alum precipitated toxoid is it not necessary to assume that these two biologicals contained proteins from the same source? As far as I am aware, pertussis vaccine is prepared from organisms grown on Bordet medium that has been enriched by the addition of either defibrinated human blood or defibrinated sheep blood. It is possible, of course, that in spite of the washings to which it is subjected during its preparation the final product might have contained small amounts of the blood. The alum precipitated toxoid, as is known, does not contain serum in the same sense as the older toxin-antitoxin mixtures contained serum. It may, however, contain small amounts of those proteins derived from the meat, usually veal, employed in the preparation of the nutrient broth in which the diphtheria organisms are grown. In the absence of definite information as to the nature of the proteins that may have been responsible for the effect observed, the conclusions stated in the answer seem to be unwarranted. Please omit name.

M.D., Ohio.

ANSWER.—Shortly after the answer to the query was prepared, an unusual (allergic) reaction following a Schick test came to notice. This reaction bore such a close resemblance to the reaction following the alum toxoid injection that it now seems quite unlikely that the preceding pertussis vaccine injection had anything to do with the reaction that followed the alum toxoid injection. Although many thousands of Schick tests had been done in the department concerned, this was the first time that an allergic reaction had followed a Schick test. It had to be controlled with epinephrine. Since no vaccine injection had preceded the Schick test, it now seems reasonable to assume that in exceptional instances alum toxoid might elicit an allergic reaction. The cause of such reactions is not known.

USE OF DIGITALIS POSTOPERATIVELY

To the Editor:—What is the modern theory with regard to the use of digitalis in other than physiologic doses? It is apparently quite common for the older practitioners in this locality to give digitalis in doses of from 1 to 3 grains (0.065 to 0.2 Gm.) of the powdered leaf in cases of mild cardiac insufficiency commonly observed in old patients postoperatively. Is there any reason to suppose that such doses exert any effect on the heart muscle? I have recently seen a 75 year old man three days after operation with a temperature of 102 and the pulse 130 but regular. The blood pressure was 130 systolic, 90 diastolic. Physical examination of the chest showed numerous coarse râles throughout. Medication consisted of 7½ grains (0.5 Gm.) of caffeine every four hours, one-thirtieth grain (0.002 Gm.) of strychnine every four hours and 1 cat unit of digitalis subcutaneously every six hours for four doses. Kindly criticize such treatment. Please omit name.

M.D., Arizona.

ANSWER.—The routine administration of digitalis postoperatively is often practiced, but so far adequate evidence is lacking to prove definitely that such empirical use is really rational or beneficial. Elderly patients without previous congestive failure do not develop heart failure immediately following operation. If circulatory complication develops, it usually consists in varying degrees of failure of the peripheral circulation. In this condition digitalis is not beneficial so far as we know. If there should be true myocardial failure, as manifested by pulmonary or peripheral congestive failure following operation, digitalis is indicated. It is doubtful, however, whether such small doses as from 0.065 to 0.2 Gm. of powdered leaf administered daily will have any appreciable effect, because this dose is close to the amount eliminated from the human body and hence accumulation would not occur or would develop very slowly. It is recognized, on the other hand, that considerably smaller amounts of digitalis than those advocated in recent years can improve the failing heart.

In this specific case, digitalis was given in four doses of 0.1 Gm. each of a standard preparation. Such an amount is insufficient to induce with certainty beneficial results in a heart that is failing, provided the patient's heart is capable of responding to digitalis; experience shows that not every instance of heart failure, particularly with regular rhythm, responds favorably. As far as additional medication, such as caffeine and strychnine, is concerned, the beneficial effect would be on the peripheral circulation. If evidence of circulatory collapse is present, such medication is often beneficial. The routine use of digitalis, caffeine and strychnine postoperatively as a preventive of either myocardial or peripheral circulatory failure is not rational.

Fever and rapid pulse developing postoperatively are usually associated primarily with changes in the peripheral circulation. The level of the blood pressure does not rule out the existence of such a condition, as the pressure may previously have been higher. The coarse râles in the lungs may be the result of infection, or of failure of the myocardium. The administration of caffeine and strychnine is therefore rational. If the correspondent believes that the pulmonary signs developed as a result of failure of the heart, more prolonged digitalis therapy than that given is also in order.

HEARING WATCH TICK AND WHISPERED VOICE

To the Editor:—Will you kindly give me the interpretation of the following: A patient is not able to hear the tick of a watch at a distance of 2 feet but is able to hear a whispered voice at a distance of 20 feet.

V. W. JENSEN, M.D., Shelby, Mich.

ANSWER.—The tick of certain watches is extremely faint. Furthermore, the sounds produced by watches are in the nature of noises, and it is quite possible that the pitches of some of these sounds is much higher than those of the ordinary whispered voice. Therefore, if the individual had an impairment of hearing for the high tones he might hear the middle tones of the whispered voice but not those of the watch tick. It is also essential to know whether the opposite ear was tightly closed while the ear was being tested with the whispered voice; otherwise the sounds may be carried through the air to the normal ear and heard at a great distance. One should remember that noises are sounds produced by irregular vibrations and not like those of pure tones, which consist of regular even vibrations.

PHLEBITIS AFTER INJECTION OF VARICOSE VEIN

To the Editor:—Following an injection of 3 cc. of sodium morrhuate into a varicosed vein on the anterior aspect of the middle third of the leg, a woman was confined to bed for a month because of pain on walking. Relief from pain is obtained by rest, elevation of the limb and ice bags. The injected vein for about 3 inches is prominent and very tender to touch. The reaction is confined to the vein and not to the perivenous tissues. The patient is still confined to bed. What can be done to make her ambulant? The deep veins are patent. Please omit name.

M.D., New York.

ANSWER.—From the description, the case is that of an induced phlebitis, which often follows an injection into a vein harboring a latent infection. It is often difficult to diagnose a latent infection before the injection, but when the vein is tender and hard, if the temperature of the skin is slightly elevated or if the patient complains of feeling changes of weather in the affected area, the diagnosis of a latent infection is probable. Such veins may respond with a marked tubular phlebitis even after a simple puncture. Should the deep vein be patent there is no reason to keep the patient confined in bed. An Unna's boot relieves the pain readily, so that the patient may be up and around without much discomfort. If the phlebitis is spreading upward and shows no tendency to quiescence, a high saphenous ligation may be done to prevent further ascension of the clot and to remove increased pressure from the inflamed vein. Occasionally the severe pain is due to a direct involvement of the saphenous nerve, in which case the nerve might have to be sectioned at a higher level to relieve pain. A mild dose of x-rays over the inflamed area, not exceeding 100 roentgens, is often helpful.

AUTOGRAFTS IN BURNS

To the Editor:—We have a patient in our hospital who had a very extensive burn. We have grafted him a number of times but as yet do not have complete coverage. The skin area available on his own body is practically exhausted and we shall be forced to look elsewhere for grafts. The patient is one of a set of twins and we should like to know whether a graft from his twin brother would be more valuable than a true heterogenous graft.

HARRY C. DEBOURCY, M.D., Davenport, Iowa.

ANSWER.—Autografts are by far the most uniformly successful, but if these are not available members of the patient's immediate family, particularly those of the same blood group, should prove the most satisfactory donors of skin. The twin brother, if he is of the same blood group as the patient, should prove satisfactory but probably not more so than other brothers or sisters who are of the same group.

DACRYOCYSTITIS AFTER OPERATION FOR NASAL POLYPS

To the Editor:—I have under my care at present a man who had a rather marked epiphora shortly after an operation for the removal of nasal polyps. At the present time he is suffering from an acute dacryocystitis. I should like your opinion as to whether or not an attempt should be made to open the intranasal end of the tear duct or whether because of the acute dacryocystitis an extirpation of the lacrimal sac should be done after the infection has subsided. Then again is there any explanation as to why excision of the sac diminishes the tearing? Kindly omit name.

M.D., New Jersey.

ANSWER.—It is possible that the nasal operation injured the mucosa at the nasolacrimal opening and partially or completely occluded the passage. If only an edema had been present, the epiphora should have disappeared in ten days. It is possible for the infection to have involved the tear sac, or that the sac infection may have been incidental. We do not advise probing during the acute dacryocystitis. Application of heat until the infection clears is the best treatment. If a large abscess is present, it should be incised. The West or Toti-West operation is done in these cases to make an enlarged permanent opening between the tear sac and the nose. If the sac is removed, the epiphora remains unless a sinus forms between the punctum and the nose, but this is not the rule.

ACTION OF PHYSOSTIGMINE ON PUPIL

To the Editor:—Would you please advise me as to whether or not physostigmine when contracting the pupil exerts any action on either the ciliary circular muscular fibers or the longitudinal? If so, which? Please omit name.

M.D., Ohio.

ANSWER.—In his Text Book of Ophthalmology (**1**:535) Duke Elder writes: "Eserine [physostigmine] instilled into the conjunctival sac brings about a miosis and a spasm of accommodation, which commence in a few minutes and reach a maximum in about thirty minutes. The effect on the ciliary muscle wears off in about two hours, but for some considerable time thereafter the accommodation remains in a hyperexcitable state, so that the slightest voluntary effort throws it into a strong spasm." The miosis lasts longer, from twelve to fourteen hours. Physostigmine stimulates the oculomotor end apparatus. The circular, meridional and radial fibers are affected. Contraction of the last two produces a pull on the choroid and indirectly on the retina, while all fibers take part in opening the canal of Schlemm. On page 61 of his book, Duke Elder likens the ciliary muscle under physostigmine to that of the muscle of a hyperopic eye as compared with that of the normal or emmetropic eye.

NO ADDED VALUE TO MENTHOLATED CIGARETS FOR ASTHMATIC PATIENTS

To the Editor:—Please give me the general consensus as to whether mentholated cigarets as compared to other cigarets are beneficial or harmful to a smoker with an irritable throat or a tendency to asthmatic bronchitis.

M.D., Pleasantville, N. Y.

ANSWER.—There is no definite answer as to the question of the relative good or bad resulting to a smoker from using the various kinds of mentholated and nonmentholated cigarets.

In a personal communication, Yandell Henderson, working in the Laboratory of Applied Physiology at Yale University, writes: "Investigations which we have carried out show that menthol in cigarets is entirely without harmful effect. Aside from the cool sensation, mentholated cigarets are in no respect different from any other."

In general, it might be said that if people with sensitive throats or with a tendency to bronchial asthma or asthmatic bronchitis must smoke they will find little difference in the results from mentholated or nonmentholated cigarets.

SCIATICA

To the Editor:—Will you kindly tell me whether you consider sciatica primary or secondary when due to diabetes, syphilis, focal infection, alcohol and arsenic? Kindly omit name.

M.D., Indiana.

ANSWER.—Sciatica as a prominent symptom can scarcely be spoken of as primary or secondary. The term sciatica signifies a pain along the course of the sciatic nerve and this may be produced by processes either intrinsic or extrinsic to the nerve. Diabetes, syphilis, focal infection, alcohol and arsenic produce intrinsic changes and give signs of a sciatic neuritis.

Pelvic tumors and arthritis of the spine or sacrum affect the nerve extrinsically by distortion or tension and the pain thus induced is usually designated as sciatica.

Medical Examinations and Licensure

COMING EXAMINATIONS

ALABAMA: Montgomery, June 24-26. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

AMERICAN BOARD OF PEDIATRICS: St. Louis, Nov. 19. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

ARIZONA: *Basic Science.* Tucson, June 18. Sec., Dr. Robert L. Nugent, Science Hall, University of Arizona, Tucson. *Medical.* Phoenix, July 2. Sec., Dr. J. H. Patterson, 826 Security Bldg., Phoenix.

CALIFORNIA: San Francisco, July 8-11 and Los Angeles, July 22-25. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

COLORADO: Denver, July 2. Sec., Dr. Harvey W. Snyder, 422 State Office Bldg., Denver.

CONNECTICUT: Hartford, July 9-10. *Endorsement.* Hartford, July 23. Sec., Medical Examining Board, Dr. Thomas P. Murdock, 147 W. Main St., Meriden.

DISTRICT OF COLUMBIA: Washington, July 8-9. Sec., Commission on Licensure, Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: Jacksonville, June 17-18. Sec., Dr. William M. Rowlett, P. O. Box 786, Tampa.

HAWAII: Honolulu, July 8-11. Sec., Dr. James A. Morgan, 48 Young Bldg., Honolulu.

ILLINOIS: Chicago, June 25-28. Address, Department of Registration and Education, Springfield.

INDIANA: Indianapolis, June 25-27. Sec., Board of Medical Registration and Examination, Dr. William R. Davidson, Room 5 State House Annex, Indianapolis.

KANSAS: Topeka, June 18-19. Sec., Board of Medical Registration and Examination, Dr. C. H. Ewing, 609 Broadway, Larned.

MAINE: Augusta, July 2-3. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton Jr., 192 State St., Portland.

MARYLAND: Baltimore, June 18-21. Sec., Dr. John T. O'Mara, 1211 Cathedral St., Baltimore.

MASSACHUSETTS: Boston, July 9-11. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413 State House, Boston.

MINNESOTA: Minneapolis, June 18-20. Sec., Dr. E. J. Engberg, 350 St. Peter St., St. Paul.

MISSISSIPPI: Jackson, June 25-26. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.

NATIONAL BOARD OF MEDICAL EXAMINERS: The examination will be held in all centers where there are class A medical schools and five or more candidates desiring to take the examination, June 24-26 and Sept. 16-18. Ex. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

NEW JERSEY: Trenton, June 18-19. Sec., Dr. James J. McGuire, 28 W. State St., Trenton.

NEW YORK: Albany, Buffalo, New York and Syracuse, June 24-27. Chief, Professional Examinations Bureau, Mr. Herbert J. Hamilton, Room 315 Education Bldg., Albany.

NORTH DAKOTA: Grand Forks, July 2-5. Sec., Dr. G. M. Williamson, 4½ S. 3d St., Grand Forks.

PENNSYLVANIA: *Written.* Philadelphia and Pittsburgh, July 9-11. *Bedside.* Philadelphia, July 12-13. Dir., Bureau of Professional Licensing, Mr. W. M. Denison, 400 Education Bldg., Harrisburg.

RHODE ISLAND: Providence, July 2-3. Dir., Department of Public Health, Dr. E. A. McLaughlin, 319 State Office Bldg., Providence.

SOUTH CAROLINA: Columbia, June 25. Sec., Dr. A. Earle Boozer, 505 Saluda Ave., Columbia.

SOUTH DAKOTA: Rapid City, July 16-17. Dir., Division of Medical Licensure, Dr. Park B. Jenkins, Pierre.

TEXAS: Austin, June 18-20. Sec., Dr. T. J. Crowe, 918-19-20 Mercantile Bldg., Dallas.

UTAH: Salt Lake City, July 8-10. Dir., Department of Registration, Mr. S. W. Golding, 326 State Capitol Bldg., Salt Lake City.

VERMONT: Burlington, June 26-28. Sec., Board of Medical Registration, Dr. W. Scott Nay, Underhill.

VIRGINIA: Richmond, June 19-21. Sec., Dr. J. W. Preston, 28½ Franklin Road, Roanoke.

WASHINGTON: *Basic Science.* Seattle, July 11-12. *Medical.* Seattle, July 15-17. Dir., Department of Licenses, Mr. Harry C. Huse, Olympia.

WEST VIRGINIA: Clarksburg, July 8. State Health Commissioner, Dr. Arthur E. McClue, Charleston.

WISCONSIN: Milwaukee, June 25-28. Sec., Dr. Robert E. Flynn, 401 Main St., LaCrosse.

Oklahoma March Examination

Dr. J. M. Byrum, former secretary, Oklahoma State Board of Medical Examiners, reports the oral and written examination held in Oklahoma City, March 12-13, 1935. Four candidates were examined, all of whom passed. Eight physicians were licensed by reciprocity. The following schools were represented:

School	PASSED	Year Grad.
University of Illinois College of Medicine		(1934)
Tulane University of Louisiana School of Medicine		(1930)
Creighton University School of Medicine		(1933)
Universität Heidelberg Medizinische Fakultät		(1923)

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
College of Physicians and Surgeons, Arkansas		(1910)	Arkansas
Johns Hopkins University School of Medicine		(1924)	Maryland
University of Minnesota Medical School		(1930), (1932)	Minnesota
University of Nebraska College of Medicine		(1933)	Nebraska
Western Reserve University School of Medicine		(1928)	Ohio
University of Tennessee College of Medicine		(1930) (1933)	Minnesota, Tennessee

California Reciprocity and Endorsement Report

Dr. Charles B. Pinkham, secretary, California State Board of Medical Examiners, reports 29 physicians licensed by reciprocity and six physicians licensed by endorsement from Jan. 2 to Feb. 19, 1935. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
College of Medical Evangelists		(1932)	Nevada
University of Colorado School of Medicine		(1926) (1932)	Hawaii, Washington
University of Georgia Medical Department		(1925)	Georgia
Hahnemann Medical College and Hospital, Chicago		(1902)	Illinois
Northwestern Univ. Med. School		(1932)	New York, Ohio
University of Illinois College of Medicine		(1915) (1932), (1933)	Michigan, Illinois
Indiana University School of Medicine		(1930)	Minnesota
State University of Iowa College of Medicine		(1923), (1928), (1930), (1931)	Iowa
Harvard Univ. Medical School		(1921)	Connecticut, (1924) Utah
University of Minnesota College of Med. and Surg		(1902)	Minnesota
University of Minnesota Medical School		(1919)	Minnesota
St. Louis University School of Medicine		(1933)	Missouri
Columbia Univ. College of Physicians and Surgeons		(1905)	New York
Long Island College Hospital		(1913), (1915)	New York
University of Cincinnati College of Medicine		(1933)	New York
University of Oklahoma School of Medicine		(1927)	Oklahoma
Hahnemann Med. Coll. and Hospital of Philadelphia		(1933)	Oregon
University of Tennessee College of Medicine		(1933)	Tennessee
McGill University Faculty of Medicine		(1930)	Connecticut
Magyar Királyi Pázmány Petrus Tudományegyetem Orvosi Fakultasa, Budapest		(1920)	New York

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Loyola University School of Medicine		(1930)	N. B. M. Ex.
Northwestern University Medical School		(1931)	N. B. M. Ex.
State University of Iowa College of Medicine		(1905)	U. S. Army
Washington University School of Medicine		(1929)	N. B. M. Ex.
Columbia Univ. Coll. of Phys. and Surg		(1929), (1930)	N. B. M. Ex.

Book Notices

What You Should Know About Heart Disease. By Harold E. B. Pardee, M.D., Assistant Professor of Clinical Medicine, Cornell University Medical School. Second edition. Cloth. Price, $1.50. Pp. 127, with 4 illustrations. Philadelphia: Lea & Febiger, 1935.

This was written to help the heart patient to understand his condition. "The better he is able to do this, the better he will be able to aid in his own cure by cooperating with the physician who is trying to correct the unpleasant result of the disease." The text is well printed and durably bound. Technical language, in the main, is successfully avoided. Only four explanatory diagrams are employed and the book lacks an index. The first chapter is devoted to the anatomy and physiology of the heart and circulation. The second chapter is a discussion of the causes of heart disease and an explanation of the resultant pathologic changes. Arteriosclerosis, rheumatic fever, syphilis, goiter, lead, alcohol, diabetes and hypertension are included. It is the author's view that tobacco as a cause of heart problems is much maligned. It will disappoint many readers that only a short paragraph is devoted to the "nervous heart." The symptoms of heart disease are discussed in detail and the cardiac irregularities and murmurs are explained. The fifth chapter is devoted to prognosis and the next four chapters contain a discussion of methods of treatment. Special attention is given to the treatment of the causative factors, and detailed instructions are given concerning dietary management. Drug therapy includes a discussion of mercury, digitalis and glyceryl trinitrate. The theobromine derivatives, mercurial diuretics and opiates are omitted. The need of recreation is discussed and the advantages of southern climate in rheumatic disease are noted. One chapter is devoted to the selection of occupation by cardiac patients and the problems of marriage and pregnancy. In surgical operations with anesthesia, the author suggests starting the operation under chloroform and continuing with ether rather than gas anesthesia. The author clearly makes his point that proper management of a cardiac case is best obtained by full cooperation of the patient with the physician. Lack of accurate knowledge of the cardiac problem by the patient begets unreasonable fear. The book is deserving of recommendation by the physician to his cardiac patients.

A Textbook on Surgery for Students and Physicians. By W. Wayne Babcock, A.M., M.D., LL.D., Professor of Surgery and Clinical Surgery in the Temple University. Second edition. Cloth. Price, $10. Pp. 1312, with 1,040 illustrations. Philadelphia & London: W. B. Saunders Company, 1935.

This edition shows much revision as well as new material. It is a large volume with numerous illustrations. The subject of surgery has grown to proportions demanding treatment in many-volumed systems by numerous collaborators. There remains, however, a definite need for a one volume textbook. The advantages to the student in saving of time is obvious. Babcock's book meets the ideal of economy of time without the sacrifice of quality. It is divided into four parts. The first part, on general surgery, deals with the subjects of inflammation, repair of tissues, hemorrhage, thrombosis and embolism, shock, coma and so on. The second part treats of the surgery of systems. The third part describes surgical technic. The fourth part is devoted to regional surgery. The textbook in its first edition found a wide acceptance among teachers and students. In its revised form it is abreast of the time in every chapter.

Die künstliche Zwerchfellähmung bei der Behandlung der Lungentuberkulose. Von. Prof. Dr. Th. Naegeli, Oberarzt der Chir. Univ.-Klinik Bonn. a. Rh., und Dr. H. Schulte-Tigges, Chefarzt der Heilstätte Rheinland, Honnof/Rhein. Nr. 54, Tuberkulose-Bibliothek, Beihefte zur Zeitschrift für Tuberkulose. Herausgegeben von Prof. Dr. Lydia Rabinowitsch. Boards. Price, 7.40 marks. Pp. 61, with 49 illustrations. Leipzig: Johann Ambrosius Barth, 1935.

This treatise systematically and thoroughly discusses the technical and clinical phases concerned with phrenic nerve surgery, considering not only the authors' idea and experiences but also the facts and opinions that have been presented by others in the extensive literature on the subject. The anatomy of the accessory branches and the communications with the sympathetic system are carefully described. Many varying views concerning the part played by the diaphragm in respiration and expectoration and the effect of paralysis on these functions are presented, which indicates that there is no universal agreement on these problems. The technic of the permanent and of the temporary operations is given in detail. The large number of surgical accidents accumulated from the literature emphasizes that the operation is not a simple one, and the late complications suggest that the procedure is not to be undertaken lightly. In considering the indications for the operation, the authors quote results of many reported series of cases so that one can judge the type of case in which best results have been obtained and the groups in which less benefit has been derived. The authors feel that it is very difficult to predict in the individual case how much benefit will result, and therefore it may be well to perform a temporary operation first and later make this permanent if a prolonged paralysis seems desirable. They feel that paralysis of the diaphragm judiciously applied is of distinct value in the treatment of pulmonary tuberculosis. Forty-eight roentgenograms demonstrate excellent results following phrenic nerve interruption in the cases of pulmonary tuberculosis. A complete bibliography is given. The work can be recommended as one of the most complete presentations of this subject.

Nutrition and Physical Fitness. By L. Jean Bogert, Ph.D., Consultant in Nutrition, Delineator Institute, New York. Second edition. Cloth. Price, $3. Pp. 566, with 65 illustrations. Philadelphia & London: W. B. Saunders Company, 1935.

This useful and thoroughly practical book now appears with revisions and amplifications particularly on the subject of vitamins. The dominant trend in the book is still maintained. It is the author's purpose to show mainly how nutritional knowledge may be used intelligently in everyday life for the building of positive health. The book is well balanced and written in a simple and direct manner. The author has anticipated the reader's desire not only for theoretical information concerning nutrition but also for practical data concerning foods and their methods of preparation. The text is divided into five parts, the first three being concerned with the fundamentals. The first part deals with qualitative aspects of the diet, next how this should be supplied in terms of calories and percentage composition and, concluding this section, a discussion of how this is made available to the body cells. The last two sections

are practical methods by which such information is applied in normal and special conditions. The last two parts of the book are particularly valuable, as they contain useful information not often presented in such a practical and comprehensive manner. Chapters on menu planning, economics and influences of cooking, food fads and fancies, and trends in American dietary habits are decidedly original and useful discussions. The section on diets for special conditions is clearly presented and well done. The entire book shows careful editing of the authors and timely knowledge of scientific advance in nutrition. The book is especially recommended to the nurses and students of nutrition as a well balanced, modern, critical presentation of the subject. It is too limited in scope and data, however, to serve as a single reference work for physicians.

Klinik der Erkrankungen des Herzmuskels. X. Fortbildungs-Lehrgang in Bad-Nauheim 20.-23. September 1934. Herausgegeben von der Vereinigung der Bad-Nauheimer Ärzte. Paper. Price, 10 marks. Pp. 170, with 63 illustrations. Dresden & Leipzig: Theodor Steinkopff, 1934.

This contains a series of lectures intended for the use of postgraduate students. Various authoritative men, as Krehl, Nonnenbruch and Hochrein, have contributed. Each lecture is a unit yet the whole book gives a good statement of recent advances in the entire field. An accurate degree of emphasis is maintained throughout. Aschoff in one lecture discusses the myocardial disorders not caused by coronary disease. He places great emphasis on the myocardial injury during acute infections and its pathogenesis. The book can be read with profit by men in general practice as well as by specialists.

Medical Greek and Latin at a Glance. By Walter R. Agard, B. Litt., Professor of Greek, University of Wisconsin. With an introduction by C. H. Bunting, M.D., Professor of Pathology, University of Wisconsin. Photo-Lithoprint Reproduction of Author's Manuscript. Paper. Price, $1.10. Pp. 42. Ann Arbor: Edwards Brothers, Inc., 1935.

There has always been a need for a handbook of useful etymological data of Greek and Latin words among most medical students and physicians. While Latin usually is part of premedical training, they have little experience with scientific terms. The complexity that Greek introduces for the student is often bewildering. However, such intricate terminology becomes relatively simple by learning a few principles of word construction. This handbook first presents prefixes in both Latin and Greek which are constantly encountered, then the common suffixes, and finally the principles for compounding words. A list of important medical terms derived from Greek and Latin are appended to aid the reader in seeing how compounds are formed. The book is in a sense a key to word formation and not a treatise on Greek and Latin medical terminology. As such, it serves a most useful purpose and should be the property of every medical student and physician who has not had the benefit of a classical education.

Methodik der Vitaminforschung. Von Dr. Phil. Christian Bomskov, Chemiker an der Universitätskinderklinik Kiel. Mit einer Einführung von Prof. Dr. med. E. Rominger. Paper. Price, 24 marks. Pp. 301, with 92 illustrations. Leipzig: Georg Thieme, 1935.

The introduction of a textbook on methods and chemistry of the vitamins should be welcomed by all workers in the field. While a book of this character will need frequent revision to meet current advances, it fills a much needed place. Too often the worker in the field of vitamin research must go through a vast amount of current literature in order to get useful data on technic. This monograph is a collection of all current methods on vitamin research. It is exceedingly well organized and edited. The text is replete with valuable protocols, illustrations and graphs, which add considerably to the text. It will be particularly valuable to the novice, as the author has included not only advanced material but such fundamental subjects as selection and care of laboratory animals, their spontaneous diseases, and the feeding of animals used for vitamin research. The author's selection of methods is excellent. When there is any doubt, alternative methods are given. While considerable advance has taken place since the chapter on vitamin C was written, it is still a valuable addition to the book and recent enough for fundamental research. A vast amount of literature, both foreign and American, has been reviewed and the reader will find the bibliography unusually complete and helpful. It is highly recommended to the novice and also the trained worker engaged in vitamin research.

Studies in Physiological Optics (Wilmer Institute), December 1928 to October 1934. Volumes I and II. Edited by C. E. Ferree, Director Research Laboratory of Physiological Optics, Wilmer Ophthamological Institute of the Johns Hopkins University School of Medicine. [Reprints.] Paper. Various pagination, with illustrations. Baltimore, 1934.

These are reprints of articles chiefly on visual fields, luminosity and adaptation of the eye to light that have appeared in the *Archives of Ophthalmology, American Journal of Ophthalmology, Bulletin of the Johns Hopkins Hospital, Journal of Experimental Psychology, Journal of General Psychology,* the *Personnel Journal, American Journal of Psychology, Transactions of the Illuminating Engineers Society,* the *Modern Hospital,* the *Nations Schools,* and the Physical and Optical Societies Report of Cambridge. The articles are by Ferree and his associates and are assembled in the order of their appearance in the various journals without any comments. The pages of the volumes are not numbered and there is no index. The volumes should more properly be called collected reprints of Ferree and his associates. They serve as a compact reprint file for one especially interested in visual field studies and lighting.

Nouveau traité de psychologie. Par Georges Dumas, professeur à la Sorbonne. Tome IV: Les fonctions et les lois générales. Avec la collaboration de Ch. Blondel, professeur à la Faculté des lettres de Strasbourg, et al. Cloth. Price, 120 francs. Pp. 528, with 26 illustrations. Paris: Félix Alcan, 1934.

This volume of Alcan's monumental treatise on psychology is divided into two parts, the first dealing with the general functions of organization and the second with the general laws of mental activity. Piéron discusses attention, its evolution and mechanism, habitude and memory. Association of ideas is treated by Delacroix, schematization by d'Allonnes, and symbolization by Dumas. The disrepute into which the association of ideas has fallen is reflected in the brevity of that section. In the second part of the volume Blondel points out the distinction between normal and pathologic automatism necessitated by the work of the psychiatrist de Clerambault, unfortunately recently deceased. Janet summarizes again his illuminating studies on psychologic tension and its oscillations, so neglected in these days of outrageous symbolization. The volume terminates with studies of mental activity, intellectual work, fatigue and sleep; it is better edited than the previous ones.

Elementary Human Anatomy Based on Laboratory Studies. By Katharine Sibley, Professor of Physical Education, School of Education, Syracuse University, Syracuse, New York. Cloth. Price, $4.50. Pp. 360, with 213 illustrations. New York: A. S. Barnes & Company, 1935.

This book is written from the standpoint of physical education and physical therapy. It deals especially with bones, joints and muscles and contains also brief chapters on other systems—nervous, circulatory, digestive, respiratory and the ductless glands. It represents a serious and conscientious effort to present in an orderly way such fundamental facts in the structure of the human body as would be especially interesting to students of physical education. The illustrations have been borrowed for the most part from standard works. They are well selected and instructive. The style is condensed, tabulation being often substituted for descriptive sentences, with the result that sometimes the meaning is a little uncertain. Unfortunately, the book contains mistakes in English, Latin, logic and anatomy.

Mikrochemie des Blutes. Von Dr. Friedrich Rappaport, Assistent am Institut für allgemeine und experimentelle Pathologie der Universität Wien. Monographien aus dem Gesamtgebiete der Mikrochemie. Mit einem Vorwort von Prof. Dr. Fritz Silberstein. Paper. Price, 15 marks. Pp. 206, with 51 illustrations. Vienna & Leipzig: Emil Haim & Co., 1935.

This concise textbook on microchemical technic as applied to blood is essentially a book of methods. It is written presumably for the laboratory technician. Before the discussion of each method is a brief outline of the underlying principle. The methods are described in a clear and explicit manner, and examples of calculations of the results are given under each description. It is doubtful whether this book will be received in the English speaking countries, where the Folin system of blood analysis is employed. The author has seen fit to replace practically every method that is standard in this country with one of his own choice without any apparent justification. The book is well organized and clearly presented but it is doubtful whether it will be well received here.

Blood Groups and Blood Transfusion. By Alexander S. Wiener, A.B., M.D. Cloth. Price, $4. Pp. 220, with 41 illustrations. Springfield, Ill., & Baltimore: Charles C. Thomas, 1935.

The special and most prominent feature of this book is the discussion of the recent developments of the forensic and legal applications of the blood groupings. Of the total pages, not more than half have practical value for the practicing physician; but in them practically all that is of value is included. The remainder is an important summary of hematology and blood groups of special value to students interested in the anthropologic, ethnologic and genetic phases of blood groupings.

Directory of Catholic Hospitals and Allied Agencies of the United States and Canada, 1935. Bulletin No. 21. Reprinted from Hospital Progress, Official Journal of the Catholic Hospital Association. Paper. Pp. 48. St. Louis: Catholic Hospital Association of the United States and Canada, 1935.

This is the most complete source of information that is known, in the form of an annual census, concerning all Catholic hospitals.

Medicolegal

Compensation of Physicians: Liability of County for Emergency Services Rendered Indigents.—An indigent patient was brought to the office of the plaintiff, a physician. A diagnosis of ruptured appendix was made and the patient was placed in a hospital. The plaintiff communicated immediately with the proper county commissioners, informing them of the critical condition of the patient and requesting an order to operate. The plaintiff was informed that no action could be taken until the commissioners met. Believing that further delay would prove fatal, the plaintiff operated and restored the patient to health. The county board of commissioners refused to pay the bill and the plaintiff sued and obtained judgment against the county in the trial court. The county appealed to the Supreme Court of Nebraska.

In affirming the judgment of the trial court, the Supreme Court said that in an emergency requiring an operation to save the life of an indigent the physician should, if reasonably possible, attempt to communicate with the proper authorities charged with the care of the poor of the county, but if an order to operate should be arbitrarily refused, or if the authorities should be noncommital, the necessary services may nevertheless be rendered, and the law imposes an obligation on the county to pay the reasonable value thereof.—*Miller v. Banner County (Neb.), 256 N. W. 639.*

Malpractice: Burns Following Diathermic Treatment.—The plaintiff sued the defendant-physician for damages for a burn on his back, which he attributed to a diathermic treatment by the defendant. According to the plaintiff's testimony, about two minutes after the plates had been applied and the electric current turned on he complained of heat to the defendant's nurse-employee, who was present in the room with him. A few minutes later he complained again and asked that the current be turned off and that the defendant be called, but the nurse did not heed him. When the defendant came into the room a moment later and removed the plates from the plaintiff's back and abdomen, the plaintiff, according to his testimony, "felt an awful pain as though flesh was coming off" and could smell the burning. The defendant-physician and his nurse testified, however, that the plaintiff did not complain of heat and was not burned in the treatment. From a judgment for the plaintiff, the physician appealed to the Supreme Court of Michigan.

Despite frequent warnings from the trial court that his course was hazardous, the paintiff presented his case in reverse order, producing medical witnesses and asking hypothetical questions before the plaintiff testified. He was allowed to do so on his assurance that evidence of the basic facts for his hypothetical questions would be presented later. Several of his hypothetical questions, however, seem to have been based on assumed facts and circumstances not shown by subsequent evidence. The order of proof, said the Supreme Court, on appeal, is largely in the discretion of the trial court, but the practice employed in this case is not to be commended; it prevents opposing counsel from making specific objections to hypothetical questions and hinders the court in its efforts to keep the testimony to the issue. The controlling hypothetical question, to ascertain the duty of the physician under local practice, was grounded on the statement that the patient "repeatedly" complained of being "burned." The plaintiff did not precisely so state. If the case had been presented in an ordinary manner, the question would have been excluded, but the answer given was that the defendant should have shut off the current and investigated by removing the plates. For this and other reasons, judgment was reversed and a new trial ordered.—*Sima v. Wright (Mich.), 256 N. W. 349.*

Malpractice: Sloughing of Tissue Following Subcutaneous Injection of Dextrose Solution.—The plaintiff was operated on by Dr. Ward for appendicitis. The operation revealed that the appendix had ruptured and that the plaintiff was "in the last throes of peritonitis." In order to save the patient's life, a saline solution containing 10 per cent dextrose was injected in her thighs. The intravenous method of injection could not be used because of the toxic condition of the plaintiff. A sloughing of the tissues resulted. Thereupon the plaintiff sued the hospital, the extern who administered the injections, a nurse who assisted the extern, Dr. Ward, the operating physician, and Dr. McGavack, the attending physician who administered the anesthetic. A nonsuit was granted as to the nurse. The jury returned a verdict for the hospital and the extern but gave judgment against Drs. McGavack and Ward, who thereupon appealed to the district court of appeals, first district, division 2, California. There the judgment of the trial court was reversed, with directions to enter judgment in favor of the physicians. *Callahan* v. *Hahnemann Hospital et al.* (Calif.), 26 P. (2d) 506; abstracted in THE JOURNAL, July 14, 1934, page 134.

The case was transferred to the Supreme Court of California and after careful study of the briefs and arguments that court concluded that the district court of appeals had correctly determined all questions of law and fact. The paramount duty of the physicians under the circumstances of this particular case was to endeavor to save the life of the patient and it was not malpractice to save the patient's life, even though this was accomplished by the injection of a solution containing a higher percentage of dextrose than is ordinarily injected subcutaneously, and even though sloughing resulted at the point of injection. There was no suggestion that the physicians did not possess the requisite skill or that they did not exercise their best judgment. The selection of a method of treatment is a matter of judgment. Physicians are not to be confined in their selection of methods of treatment to the use of those methods, if any, which have the universal approval of all members of the profession.—*Callahan v. Hahnemann Hospital et al. (Calif.), 35 P. (2d) 536.*

Society Proceedings

COMING MEETINGS

American Association for the Study of Goiter, Salt Lake City, June 24-26. Dr. W. Blair Mosser, 133 Biddle Street, Kane, Pa., Secretary.
American Child Health Association, Iowa City, June 19-22. Dr. Philip Van Ingen, 50 West 50th Street, New York, Secretary.
American Urological Association, San Francisco, June 25-28. Dr. Gilbert J. Thomas, 1009 Nicollet Avenue, Minneapolis, Secretary.
Maine Medical Association, York Harbor, June 23-25. Miss Rebekah Gardner, 22 Arsenal Street, Portland, Secretary.
Medical Library Association, Rochester, N. Y., June 17-19. Miss Frances N. A. Whitman, 25 Shattuck Street, Boston, Secretary.
Minnesota State Medical Association, Minneapolis, June 24-26. Dr. E. A. Meyerding, 11 West Summit Avenue, St. Paul, Secretary.
Montana, Medical Association of, Helena, July 2-3. Dr. E. G. Balsam, 208½ North Broadway, Billings, Secretary.
National Tuberculosis Association, Saranac Lake, N. Y., June 24-27. Dr. Charles J. Hatfield, Henry Phipps Institute, Philadelphia, Secretary.
North Pacific Pediatric Society, Seattle, August 9-10. Dr. F. H. Douglass, 509 Olive Street, Seattle, Secretary.
Pacific Northwest Medical Association, Spokane, Wash., June 27-29. Dr. C. W. Countryman, 407 Riverside Avenue, Spokane, Wash., Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL in continental United States and Canada for a period of three days. Periodicals are available from 1925 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

Alabama Medical Association Journal, Montgomery

4: 301-340 (March) 1935

Some of the Common Indications for Splenectomy: Case Reports. J. P. Collier, Birmingham.—p. 301.

*Management of Varicose Veins and Ulcers. J. S. Bobo, Gadsden.—p. 309.

Bichloride of Mercury Poisoning: Report of Recovered Case. G. Walsh and C. S. Stickley, Fairfield.—p. 312.

Rabies: Prevalence, Treatment, Control. G. A. Denison, Birmingham.—p. 314.

Method for Sterilizing Shoes Against Fungi. J. L. Callaway, University.—p. 319.

4: 341-372 (April) 1935

Economic Crises That Affect Medical Practice. B. W. Caldwell, Chicago.—p. 341.

Treatment of Intractable Pain, with Particular Reference to Trigeminal Neuralgia. C. Pilcher, Nashville, Tenn.—p. 346.

Allergy from Standpoint of the General Practitioner. C. K. Weil, Montgomery.—p. 351.

Abdominal Conditions in Infancy and Childhood: Differential Diagnosis. J. H. Baumhauer, Mobile.—p. 357.

Transperitoneal Removal of Unusual Malignant Tumor of Right Kidney. R. V. Taylor Jr., Mobile.—p. 360.

Management of Varicose Veins.—Bobo, in examining a varicosed leg, places a tourniquet round the lower part of the thigh just tight enough to obstruct venous return in the superficial system and allows the patient to walk about the room for several minutes in order to observe the final test of efficiency in the one system of deep veins. When there is little discomfort, no pain or cramps and no marked distention of varices, the deep veins are furnishing sufficient venous return and the varicosed ones should be injected. If there is pain and great distention, beyond the usual size of the varicosities, with marked discoloration of the skin, there is an obstruction to circulation through a failure of the venous blood to find a channel for return, and injection is contraindicated. If there is marked back pressure of blood, and the tests confirm the fact that it is from the long saphenous, there is some advantage in ligating it high up on the thigh. This eliminates most of the pressure and the actual downward flow of blood through this vein. The author employs only sodium morrhuate, and quinine and urethane. He has the patient sit on the end of the table with the foot dependent and resting on a small stool. The skin is prepared with alcohol. Injection is made directly into the lower part of the varix. The needle being in the lumen of the vein, pressure is made just below its point by the thumb of the left hand and just above by the index finger. If the finger is moved upward, the vein is flattened and the capacity of the venous segment to be injected is markedly diminished, so that a smaller amount of solution can be injected and still come in contact with the whole intima, the amount varying from 3 or 4 minims (0.2 or 0.25 cc.) to 1 cc. The needle is withdrawn and the thumb and finger are held in position for two minutes, this being ample time to produce the necessary irritation to the line of the vein. A small compress is placed over the injected site. Two or three injections to each leg are made at a sitting. The patient wears a bandage and reports in one week for further injections. The support should be worn for a month or two after the injections are completed. The author's treatment of varicose ulcers evolves around the Unna paste boot. The boot is applicable to ulcers that are not actively infected but are in a latent stage or in the stage of repair. Case reports are given, showing the value of the treatment.

American Journal of Diseases of Children, Chicago

49: 835-1104 (April) 1935

Rheumatic Infections Occurring in the First Three Years of Life. R. McIntosh and C. L. Wood, New York.—p. 835.

*Injuries to Vertebrae and Intervertebral Disks Following Lumbar Puncture. C. N. Pease, Chicago.—p. 849.

Body Build in Infants: VI. Growth of Cardiac Silhouette and Thoraco-Abdominal Cavity. H. Bakwin and Ruth Morris Bakwin, New York.—p. 861.

Id.: VII. Effect of Retarded Growth on Dimensions of Cardiac Silhouette and Thoraco-Abdominal Cavity. H. Bakwin and Ruth Morris Bakwin, New York.—p. 870.

Id.: VIII. Influence of Retarded Growth on Dimensions of Ulna and Radius. H. Bakwin and Ruth Morris Bakwin, New York.—p. 876.

Studies on Lipoids and Lipoid Diseases: IV. Lipoid Content of Tissues in Cases of Status Epilepticus, Toxic Encephalopathy and Chronic Leptomeningitis. D. M. Cowie and M. Catherine Magee, Ann Arbor, Mich.—p. 884.

Virus-Antivirus Mixtures in Smallpox Vaccination. I. A. Frisch, New York.—p. 894.

Excretion of Drugs in Milk. N. T. Kwit and R. A. Hatcher, New York.—p. 900.

Teeth in Fetal Rickets. J. J. Wolfe, Peiping, China.—p. 905.

Dermal Absorption of Vitamin D. P. S. Astrowe and R. A. Morgen, Kansas City, Mo.—p. 912.

Complications of Varicella: I. Their Occurrence Among Two Thousand Five Hundred and Thirty-Four Patients. J. G. M. Bullowa and S. M. Wishik, New York.—p. 923.

Id.: II. Surface Complications. S. M. Wishik and J. G. M. Bullowa, New York.—p. 927.

*Eosinophilia in Scarlet Fever: I. Diagnostic Aid. S. Friedman, Boston.—p. 933.

*Relation Between Infection of Upper Respiratory Tract and Gastro-Intestinal Infection in Infants, with Especial Reference to Rôle of Bacillus Morgani I. B. S. Kahn, New York.—p. 939.

Latent Cardiac Complications Following Sydenham's Chorea. H. Schwarz and S. D. Leader, New York.—p. 952.

Mineral Metabolism in Osteogenesis Imperfecta: Summary with Report of Case. W. W. Swanson and Vivian Iob, Chicago.—p. 958.

Injuries to Vertebrae Following Lumbar Puncture.—Pease states that many persons complain of pain in the lower part of the back following lumbar puncture. A study of twelve cases showed a thinning of the intervertebral disks and a definite sclerosis of the vertebral bodies, the results of loss of material from the nucleus and of irritation of the bone. Five of these occurred following the withdrawal of fluid for diagnosis, five following the intraspinal administration of antimeningococcus serum, one following an encephalogram and one following the administration of spinal anesthesia. In performing lumbar punctures on cadavers it was learned that one cannot determine when the point of the needle is actually in the neural canal. In some cases there was a slight decrease in resistance when the canal was reached, but this occurred only when the needle was introduced very delicately. However, in the majority of cases it was impossible to determine the position of the point of the needle. Similarly, if the needle was pushed in too far, one could not tell when it struck the intervertebral disk and passed into it. On the other hand, it was not difficult to ascertain the situation when the point of the needle struck a bony portion of the vertebra. Further experimental puncture on cadavers revealed that there were several possible terminations if the needle was pushed beyond the neural canal, the most common sites being the intervertebral disk, a vertebra, interarticular facets and venous sinusoids in the vertebral body. The purpose of the author's discussion is not to discourage lumbar puncture but rather to call attention to the new complications that may be added to the already long list of accidents resulting from the withdrawal of spinal fluid. In performing a lumbar puncture it is possible, unknowingly, to introduce the needle too far, penetrating the intervertebral disk or the vertebra. The sequels from this may be a narrowing of the intervertebral space, which can be demonstrated by roentgenograms. Various types of inflammatory reactions may be set up in the bony and articular elements of the spine.

Eosinophilia in Scarlet Fever.—To determine how helpful the eosinophil count may be in the early diagnosis of scarlet fever, Friedman made this count in 100 cases of scarlet fever. All counts were made at approximately the same time of day, 3 p. m. Blood smears were made by the slide method and stained with Wright's stain. A single examination of the blood revealed an elevated eosinophil count in 46 per cent of the cases in the early stages of the disease. Most of the elevated counts ranged from 5 to 8 per cent. The highest count recorded was 17 per cent. There was an elevated eosinophil count in 60 per

cent of the mild cases but in only 18.2 per cent of the moderate cases and in none of the severe cases. Forty-two of the forty-six patients giving an elevated eosinophil count in the early stages of the disease had a mild form of the disease. In the early stages, 62.1 per cent of the patients exhibiting a slight or a very slight rash had an elevated eosinophil count, while only 31 per cent of those with a moderate rash and 7.7 per cent of those with a bright or intense rash had an elevated eosinophil count. The relationship between the degree of constitutional symptoms, as typified by the temperature, and the eosinophil count is similar to the relation between the severity of the case and the eosinophil count. The type of case in which an elevated eosinophil count is most likely to be seen in an early stage of the disease is the mild case with only a slight rash and mild constitutional symptoms.

Upper Respiratory and Gastro-Intestinal Infection in Infants.—Kahn isolated Bacillus Morgani I from the stools of five out of six infants with gastro-enteritis associated with infection of the upper respiratory tract, of fifteen out of twenty-one controls and of fourteen out of thirty-eight infants from a well baby clinic. Bacillus Morgani I, B. paracoli and Proteus asiaticus can be recovered with much greater frequency than previously reported if repeated cultures of the stools are made. Bacillus Morgani I, like B. coli not normally pathogenic for man, may assume pathogenic characteristics in a small number of cases. The mere recovery of B. Morgani I from the diarrheal stool is not proof of its pathogenicity. This is also true for B. paracoli, Proteus asiaticus, B. dysenteriae Schmitz, B. dispar, B. paratyphoid C and the proteolytic bacteria. Additional evidence must be obtained to prove the pathogenicity of these organisms; namely, agglutination in high dilution with the blood serum of the suspected patient. The close clinical relationship of otitis media and infection of the upper respiratory tract to diarrhea in infants under 2 years of age is probably not due to infection of the intestinal tract with pathogenic organisms in the great majority of cases. The clinical relationship may be the manifestation of allergy or of absorption of toxins from a pathologic process in the upper respiratory tract.

Am. J. Roentgenol. & Rad. Therapy, Springfield, Ill.

33: 441-588 (April) 1935

Ossification (So-Called "Calcifications") of Normal Laryngeal Cartilages Mistaken for Foreign Body: Correlation of Roentgen and Histologic Findings. W. E. Chamberlain and B. R. Young, Philadelphia.—p. 441.

*Fusospirochetal Pneumonia. C. B. Peirce and H. Field Jr., Ann Arbor, Mich.—p. 451.

Roentgenologic Determination of Normal and Abnormal Results Following Operation on Stomach and Duodenum. B. R. Kirklin, Rochester, Minn.—p. 468.

Interposition of Colon Following Induced Phrenic Paralysis. P. Slavin, Glen Gardner, N. J.—p. 481.

*Roentgenographic Evidence in Tuberosity of Humerus of Recent and Old Injuries to Supraspinatus Tendon Attachment. L. S. Henry, Syracuse, N. Y.—p. 486.

Certain Aspects of Roentgenology of Spine from Orthopedic Point of View. R. W. Lewis, New York.—p. 491.

Lateral Roentgenography of Neck of Femur. L. Jones, Kansas City, Mo.—p. 504.

Technic for Roentgen Examination of Lumbosacral Articulation. P. C. Williams and P. E. Wigby, Dallas, Texas.—p. 511.

Oxycephaly: Report of Two Cases. A. Simon, R. Ramos and W. W. Eldridge, Washington, D. C.—p. 516.

Cineradiography. R. J. Reynolds.—p. 522.

Effect of Roentgen Therapy on Tumors of Kidney. A. E. Bothe, Philadelphia.—p. 529.

Small Platinum Needle Designed for Use of Various Strengths of Radium Element Interstitially. N. Treves, New York.—p. 537.

Fusospirochetal Pneumonia.—Peirce and Field believe that fusospirochetal pneumonia is a disease entity of definite etiology. They present eleven cases. It is characterized by a prodromal period, more or less prolonged, with dry cough, malaise and pleural pain as dominant symptoms. The gravity of the roentgen evidence of a subsequent bronchopneumonia to confluent lobular pneumonia is out of proportion to the relatively mild constitutional reaction. The sputum commonly has a "mousy" rather than a foul odor, is sometimes bloody and contains many fusiform bacilli and spirochetes, in addition to other organisms commonly associated with them in the mouth. Darkfield examination and gentian violet or silver stains of freshly washed specimens are advisable in the suspected case. There is a considerable tendency to exacerbation, spread of involvement, pleural effusion or atelectasis. Convalescence is commonly slow. Conservative treatment with complete bed rest has yielded excellent results. Bronchiectasis has been observed early in the course of two cases, followed by partial to complete repair. Arsphenamine and neoarsphenamine have not been of marked therapeutic value.

Injuries to Supraspinatus Tendon Attachment.—Henry feels that many cases of undiagnosed disability of the shoulder are caused by evulsion of the supraspinatus tendon from the greater tuberosity of the humerus and that roentgen evidence should be an aid in helping to establish proper diagnosis. Soft tissue roentgen technic with anteroposterior views with the arm in adduction and complete internal rotation reveals the site of insertion of the supraspinatus tendon in silhouette on the humerus. The pathologic observations follow exactly the anatomic descriptions by Codman and others. They are illustrated by six typical cases. Immediately after injury fine spicules of bone near or on the periosteal outlines of the greater tuberosity are seen at the site of the insertion of the supraspinatus tendon. Within a few weeks, irregular decreases and increases in density of the evulsed surface and rounding of the tuberosity are observed. From six months to a year later, irregular calcification and occasionally cysts with loss of the tuberosity prominence and disappearance of the sulcus make their appearance. Old lesions may also show proliferation of bone in old callus together with loss of the tuberosity prominence (in this view), loss of the sulcus and rearrangement of the trabeculae in the whole tuberosity and somewhat in the adjacent parts of the head of the humerus.

American Journal of Surgery, New York

28: 1-190 (April) 1935

Teaching of Obstetrics and Gynecology in the United States. H. J. Stander, New York.—p. 61.

Organic Control of Growth and New Growth. W. W. Babcock, Philadelphia.—p. 67.

Appendicitis: Analysis of Thirty-Three Hundred and Forty-Four Cases, with Remarks on Delayed Operation in Delayed Appendicitis. W. D. Haggard, Nashville, Tenn.—p. 71.

The Elliott Treatment of Pelvic Inflammatory Disease: Report of One Hundred and One Cases. R. C. Doan and W. M. Simpson, Dayton, Ohio.—p. 78.

*Complete Thyroidectomy in Advanced Heart Disease, with Observations on Its Use in Advanced Arteriosclerosis, Syphilis and Renal Disease. G. H. Pratt, New York.—p. 85.

*Prevention of Postoperative Embolism and Phlebitis, with Description of Apparatus Employed. H. A. Gamble, Greenville, Miss.—p. 93.

Bizarre Symptoms of Hypothyroidism. J. W. Hinton, New York.—p. 96.

Bilateral Cysts of the Kidney. R. Pollock, New York.—p. 101.

Duodenal Fistula Due to Perinephric Abscess and Following Nephrectomy: Case Report and Review of Literature. N. F. Ockerblad and N. G. Gonzales, Kansas City, Mo.—p. 105.

Diagnosis of Renal Tuberculosis. C. J. Bucher and T. R. Fetter, Philadelphia.—p. 113.

Influence of Hysterectomy on Endocrine Balance. R. Marx, Los Angeles.—p. 117.

Value of X-Ray in Diagnosis of Acute Abdomen. I. W. Ponemon, Jamaica, N. Y.—p. 122.

Calcification of Gallbladder. B. C. Russum and F. C. Hill, Omaha.—p. 129.

Omentopexy in Treatment of Cirrhosis of Liver. J. E. Strode, Honolulu, T. H.—p. 135.

Acute Diverticulitis of Sigmoid. R. E. Weible, Fargo, N. D.—p. 142.

Simple Expedient for Treatment of Acute and Chronic Synovitis of Knee Joint Following Trauma. C. R. G. Forrester, Chicago.—p. 145.

Giant Cell Tumor of Patella: Complete Review of Literature: Report of Case. S. A. Linde, Baltimore.—p. 150.

Thyroidectomy in Advanced Heart Disease.—Pratt traces the development of complete thyroidectomy for heart disease and makes suggestions for the extension of the procedure to the arteriosclerotic, renal and syphilitic groups, with the presentation of case summaries. He discusses a routine preoperative, operative and postoperative regimen and presents results in nineteen cases. He cites the dangers of the procedure, which include mortality during operation, tetany, recurrent laryngeal nerve injury, pulmonary complication, infection and hemorrhage with asphyxia. His observations suggest that in the routine thyroidectomy for goiter more of the gland should be removed. The large proportion of recurrence of the tumor following the old lobectomy emphasized how rapidly the remainder of the gland will hypertrophy. Especially when there is cardiac involvement, it is safer to chance the occasional myxedema than the resultant cardiac disturbance from the hyperplasia of a small piece of retained gland. The continuation or recurrence

of cardiac symptoms after thyroidectomy for toxic goiter is due, the author believes, to this removal of insufficient gland and not to a dysfunction of the adrenals or other internal secreting glands. When the cardiac lesion is advanced, the surgeon should remove all of the gland that he can find, and even then the danger will be in the retention of too much tissue. Only cases in which other therapeutic measures have failed are considered eligible for the operative procedure. Acute cases are eliminated. The author does not eliminate the syphilitic or arteriosclerotic types. He believes that the possible benefit of complete thyroidectomy in advanced tuberculosis should be considered, and in the light of the present investigations it seems plausible. The restless hyperactive state that often affects the tuberculous patient could certainly be arrested and the myxedematous tendency with slow movements, increase in weight and the desire to rest most of the time should be conducive to pulmonary healing.

Prevention of Postoperative Embolism and Phlebitis.—During the last twelve months, Gamble has employed two measures which in his opinion have had a definite preventive effect on the development of postoperative embolism and phlebitis. 1. The employment of carbon dioxide and oxygen postoperatively, which was originally instituted as a preventive of postoperative pneumonia, he has come to believe serves an equally useful purpose as a measure for preventing the occurrence of phlebitis and pulmonary embolism by the forcing of deep respiration at a period when all vital functions are at a low level. After twenty-four hours, carbon dioxide and oxygen are substituted for routine deep breathing exercises. 2. An equally if not more important measure in promoting the flow of venous blood in the lower extremities is the maintenance of the muscle tone and contraction of the muscles of the legs. This is accomplished by the systematic daily use, beginning the first day after operation, of a device consisting of two bicycle pedals mounted on a broad base, which can be placed conveniently in the bed for exercising the lower limbs. There has not been a single case of either condition when the two procedures have been employed, whereas in a similar number in which these measures were not employed there has been one fatal case of pulmonary embolism and three cases of phlebitis of the lower extremities. Another advantage of the exerciser is the maintenance of body strength.

Anatomical Record, Philadelphia

62: 1-108 (April 25) 1935. Partial Index

Method of Establishing Probable Limits of Normal Variation in Weight of Organs. Edith Boyd, Minneapolis.—p. 1.
Intra-Uterine Growth of Albino Mice in Normal and in Delayed Pregnancy. E. V. Enzmann, Cambridge, Mass.—p. 31.
Experimental Ovulation and Resulting Pseudopregnancy in Anestrous Cats. M. A. Foster and F. L. Hisaw, Madison, Wis.—p. 75.
So-Called Neutral Red "Vacuome" and Golgi Apparatus. H. C. Chang, Chicago.—p. 95.

Archives of Otolaryngology, Chicago

21: 385-506 (April) 1935

Abscess of the Brain: Report of Five Consecutive Recoveries, with Especial Reference to the Mosher Drain and Pneumographic Visualization of Abscess Cavity. A. Kaplan, New York.—p. 385.
*Acute Cerebellar Abscess: Report of Case. G. E. Shambaugh Jr., Chicago.—p. 406.
Tracheal Diverticulum: Observations on Cadaver and Results of Histologic Study. E. F. Ziegelman, San Francisco.—p. 414.
Microscopic Pathology of the Palatine Tonsil. H. D. Smith, Boston. —p. 426.
Para-Esophageal Diaphragmatic Hernia Associated with Intrinsic Lesions in Esophagus: Report of Cases. P. P. Vinson and H. J. Moersch, Rochester, Minn.—p. 437.
Cavernous Sinus Thrombosis of Dental Origin. B. P. Morgenstern, New York.—p. 442.
Ionization as a Prolonged Palliative in Vasomotor Rhinitis. A. R. Hollender, Chicago.—p. 448.
Ionization: Circuit Plans for an Inexpensive Unit. D. Macfarlan, Philadelphia.—p. 456.
Association of Toxic Deafness with Toxic Amblyopia Due to Tobacco and Alcohol. F. D. Carroll, New York, and P. E. Ireland, Toronto. —p. 459.

Acute Cerebellar Abscess.—Shambaugh reports the case of a child who was admitted to the hospital during the eruptive stage of scarlet fever. During hospitalization acute suppurative otitis media developed, complicated by thrombosis of the lateral sinus and followed by the development of a cerebellar abscess. By reviewing the clinical course in this case one can reconstruct and visualize the pathologic changes that occurred at each stage from the initial cerebral invasion to encapsulation, drainage and recovery. The stage of invasion of the abscess of the brain was characterized by predominating systemic symptoms (fever) from the advancing thrombophlebitis, the symptoms of local cerebral involvement (vomiting) being minimal. The second stage, that of early necrosis and encephalitis, was characterized by signs of rapidly increasing intracranial pressure with localizing neurologic signs beginning to appear. The third stage, that of encapsulation, was characterized by continued signs of increased intracranial pressure, but with the localizing neurologic signs predominating. The stage of recovery was marked by rapid disappearance of the signs of increased intracranial pressure followed by a more gradual recovery from the neurologic changes. Encapsulation was definitely developed three and one-half weeks after the initial cerebral invasion. Repeated aspirations were not sufficient. Constant drainage was necessary. The encephalitis surrounding the abscess was more threatening to life than the abscess itself. Had a larger drain been inserted or any attempt been made to suck out, inspect or pack the abscess cavity, the added encephalitis would probably have been fatal. In cases of acute abscess of the brain, drainage must be established with a minimum of trauma to the tissue. A rubber catheter makes a satisfactory drain, but it must actually penetrate the capsule. A preliminary decompression will relieve the acute symptoms in the early stages and allow delay in exploring until encapsulation and walling off have occurred. By limiting the dural opening to a simple half inch (1.27 cm.) incision, massive herniation is prevented. The neurologic signs of abscess of the brain were due more to the associated encephalitis than to the actual necrosis of brain tissue, as evidenced by the complete restoration of cerebellar function.

Arch. of Physical Therapy, X-Ray, Radium, Chicago

16: 193-256 (April) 1935

Cancer of Nasal Accessory Sinuses: Problems in Diagnosis and Management. F. L. Lederer, Chicago.—p. 199.
*Electrosurgical Obliteration of Gallbladder. M. Thorek, Chicago.—p. 207.
Ventriculocordectomy with Surgical Diathermy: Case Report. M. H. Cottle, Chicago.—p. 219.
Muscle Examination in Poliomyelitis. A. M. Rechtman and H. Sigmond, Philadelphia.—p. 220.
Comparative Analysis of Heat Production: Physical Analysis of High Frequency, Radio Frequency and Conductive Heat. C. J. Breitwieser and J. S. Hibben, Pasadena, Calif.—p. 228.

Electrosurgical Obliteration of Gallbladder.—Thorek believes that failures and fatalities in classic cholecystectomy are frequently due to bile leakage, as a result of an inability to obliterate and cover the gallbladder bed, which contains bile capillaries and often larger bile ducts in from 15 to 25 per cent of cases. Electrosurgical obliteration of the gallbladder, when carefully carried out, may be used in simple and complicated cases of gallbladder disease without resorting to drainage. It reduces morbidity and mortality to a minimum and shortens hospitalization. The much dreaded age factor loses its terror. Shock is absent. The term cholecystelectrocoagulectomy is descriptive of the procedure. A prerequisite to the achievement of satisfactory results is a patent common duct. An occluded cystic duct from any cause is an indication for cholecystelectrocoagulectomy. Cholecystelectrocoagulectomy is free from the drawbacks of carbonization and effectively accomplishes destruction of the entire thickness of the gallbladder and gallbladder bed. The surgeon has under control the degree of penetration he wishes to accomplish. The falciform ligament is used as a pedicle or free graft in covering sutured or raw surfaces to great advantage, thus reinforcing and protecting the areas concerned against seepage and safeguarding the processes of repair. Electrocoagulated areas in intra-abdominal organs tend to heal by encapsulation. They do not interfere with wound healing but heal promptly when the wound is closed securely. Therefore, drainage is not only undesirable but is distinctly deleterious. Drainage prolongs the healing process and predisposes to infection. Cholecystelectrocoagulectomy eliminates the necessity of drainage and its unpleasant sequels. This method when properly carried out substitutes for a leaking, unprotected, raw surface in the gallbladder bed a sterile, hyaline, dry protective layer. A series of 118 consecutive, unselected cases were thus treated without a fatality.

California and Western Medicine, San Francisco

42: 233-336 (April) 1935

Problem of Prostatism: Suprapubic or Perineal Prostatectomy versus Transurethral Resection, and Glandular Therapy versus Operation of Any Kind. F. Hinman, San Francisco.—p. 234.
Tularemia in California. H. E. Miller, San Francisco.—p. 236.
Medical Economic Survey of Sacramento County. N. Hale, Sacramento. —p. 241.
Dietary Management in Pregnancy. D. G. Tollefson and Katharine Brown, Los Angeles.—p. 247.
*Resection of Stomach for Carcinoma: Important Technical Considerations. E. Holman, San Francisco.—p. 252.
Urinary Calculi, Cause and Treatment. M. B. Wesson, San Francisco. —p. 258.

Resection of Stomach for Carcinoma.—Holman believes that whenever feasible subtotal gastrectomy with complete resection of the lesser curvature is the method most likely to ensure complete removal of the original growth and the involved lymphatic channels and nodes in gastric carcinoma. Formation of a small tubelike stomach from the remaining greater curvature permits reestablishment of gastro-intestinal continuity by end-to-side anastomosis with the jejunum. A retrocolic anastomosis is preferable, but no traction at the site of union by the mesocolon is permissible and, when imminent, should be avoided by an antecolic gastro-enterostomy, supplemented by a jejuno-jejunostomy. Avoidance of bleeding at the operation and complete hemostasis by direct ligation of all individual bleeding vessels prevent embarrassing postoperative complications. To improve the results in the treatment of gastric cancer every "corporic" ulcer located off the lesser curvature should be treated, from the moment its presence is demonstrated, as probably neoplastic in origin and therefore subject to subtotal resection, and every gastric ulcer on the lesser curvature should be resected if two months of well controlled medical care does not both relieve symptoms and cause a diminution in the size of the ulcer with ultimate disappearance of the ulcer. Every ulceration on the gastric side of the pylorus, accompanied by symptoms that persist in the face of medical care, should be considered probably neoplastic in origin and therefore subject to resection. It cannot be emphasized too strongly that the absence of anemia, loss of weight and palpable tumor and the presence of a normal gastric acidity are not incompatible with gastric cancer.

Illinois Medical Journal, Chicago

67: 293-388 (April) 1935

Modern Diet and the Child Bearing Problem. D. T. Quigley, Omaha. —p. 339.
Present Status of Ocular Surgery. O. B. Nugent, Chicago.—p. 345.
The Benign Meliturias. T. D. Masters, Springfield.—p. 351.
The Clinic Habit. C. H. Parkes, Chicago.—p. 354.
Preparedness for Acid or Alkali Burns of the Eye. A. B. Middleton, Pontiac.—p. 357.
Statistical Status of Diabetes. G. H. Gowen, Chicago.—p. 360.
Transurethral Prostatic Resection. G. J. Thompson, Rochester, Minn. —p. 365.
Calculous Disease of Urinary Tract. L. A. Maslow, Chicago.—p. 367.
Postspinal Anesthetic Headache: Review of Literature and Suggestions for Treatment. S. Peluse, Chicago.—p. 372.
Poisonous Spider Bites in Illinois: Case Reports. T. Kirkwood, Lawrenceville.—p. 377.
Rupture of Quadriceps Tendon Above Patella with Surgical Repair. F. G. Murphy, Chicago.—p. 379.
Painless Coronary Occlusion. F. Stenn, Chicago.—p. 381.
Silicosis. W. Stewart, East St. Louis.—p. 382.

Iowa State Medical Society Journal, Des Moines

25: 169-224 (April) 1935

Advances in Internal Medicine in 1934. J. S. McQuiston, Cedar Rapids.—p. 180.
Nontuberculous Infections of Chest. J. H. Peck, Des Moines.—p. 183.
Surgical Treatment of Pulmonary Infection. H. L. Beye, Iowa City. —p. 187.
Treatment of Empyema. R. H. Lott, Carroll.—p. 190.
Relationship of Bronchoscopy to Thoracic Surgery. J. A. Downing, Des Moines.—p. 192.
Management of Allergic Manifestations of Nose and Throat. J. J. Shea, Memphis, Tenn.—p. 193.
Isolated Nonreducible Fracture of Middle Third of Radius. A. L. Jensen, Council Bluffs.—p. 196.
Classification of Anemias. V. E. Levine, Omaha.—p. 198.
Modern Conception and Management of Acne Vulgaris. M. H. Noun, Des Moines.—p. 201.
Salient Features in Treatment of Cardiac Failure. H. W. Rathe, Waverly.—p. 203.

Journal of Lab. and Clinical Medicine, St. Louis

20: 675-784 (April) 1935

*Cholesterol Content of Plasma in Arthritis. E. F. Hartung and M. Bruger, New York.—p. 675.
Observations on the Indican Test on Blood and Urine in Renal Insufficiency. S. H. Polayes and Elizabeth Ann Eckert, Brooklyn.—p. 681.
Bacteriostatic and Bactericidal Studies of Various Dyes and Allied Compounds. S. A. Petroff and W. S. Gump, Trudeau, N. Y.—p. 689.
*Blood Wassermann Test in Five Hundred Cases of Neurosyphilis with Positive Cerebrospinal Fluids. W. C. Menninger, Topeka, Kan., and L. Bromberg, Chicago.—p. 698.
Diurnal Variations in Concentration of Red Blood Cells and Hemoglobin. J. J. Short, New York.—p. 708.
The Laboratory as an Approach to Anemic Therapy. T. G. Schnabel, Philadelphia.—p. 714.
Effect of Jaundice on Intradermally Injected Salt Solution. J. M. Mora and F. J. Jirka, Chicago.—p. 719.
Differential Count at High Altitudes. R. F. Peterson, Butte, Mont., and W. G. Peterson, Warren, Minn.—p. 723.
Are Brucella Abortus Agglutinins in Blood Stream Produced by Active or Passive Immunization? C. Emelia Peterson, San Francisco.—p. 727.
*Eosinophilia in Syphilis: Comparative Study of Differential Leukocyte Counts in One Hundred Positive and One Hundred Negative Blood Wassermann Cases. R. H. Spangler, Philadelphia.—p. 733.
Simple Micromethod for Determination of Alcohol in Biologic Material. R. N. Harger, Indianapolis.—p. 746.
Stability of Sugar in Cerebrospinal Fluid. P. G. Schube, Boston.—p. 752.
Antigen Mixing Tube for the Kahn Test. R. S. Spray, Morgantown, W. Va.—p. 754.
Determination of Nitrate in Animal Tissues. Mary Whelan, Oklahoma City.—p. 755.
Micro-Kjeldahl Technic for Determining Fibrinogen. Helen R. Garbutt and R. S. Hubbard, Buffalo.—p. 758.
New Clinical Model of Haden-Hausser Hemoglobinometer. R. L. Haden, Cleveland.—p. 762.
Tenth Normal Hydrochloric Acid as Diluting Fluid for Combined Leukocyte and Hemoglobin Determinations. C. A. Pons, Asbury Park, N. J., and W. P. Belk, Ardmore, Pa.—p. 766.
Percentage of Hemoglobin Compared to Volume of Erythrocytes: Importance of This Relation in Correcting Van Allen Determination of Volume of Platelets. K. K. Nygaard and Doris L. Duxbury, Rochester, Minn.—p. 767.

Cholesterol Content of Plasma in Arthritis.—Hartung and Bruger compared the plasma cholesterol in arthritic patients with cholesterol studies in thirty-three normal subjects. In the rheumatoid group (thirty-three cases) the average age was 39 years; 63 per cent of the patients were women. The mean total cholesterol was 175.2 ± 39.5 mg. per hundred cubic centimeters of plasma. When these figures were compared with the control group the results indicated that 49 per cent of the rheumatoid cases gave normal values, 39 per cent showed hypocholesterolemia and 12 per cent showed hypercholesterolemia. The esterified cholesterol showed a normal relation to the total cholesterol, varying from 46.6 to 76.8 per cent with a mean of 60.9 per cent. No absolute correlation was observed between the total plasma cholesterol and the sedimentation rate. In the osteo-arthritic group of fifty-nine patients the average age was 51 years; 90 per cent were women. The mean total cholesterol was 235.4 ± 45 mg. per hundred cubic centimeters of plasma. Hypercholesterolemia was observed in 62 per cent, 35 per cent gave normal values and only 3 per cent showed hypocholesterolemia. The cholesterol esters in this group also showed a normal relation to the total cholesterol, varying from 42.9 to 75.3 per cent with a mean of 59.4 per cent. Here again no definite correlation was observed between the sedimentation rate and the total blood cholesterol. The plasma cholesterol tends to be low in rheumatoid arthritis and elevated in osteo-arthritis. These observations lend added proof to the theory that rheumatoid arthritis is an infectious disease and osteo-arthritis a degenerative one.

Blood Wassermann Test in Neurosyphilis.—Menninger and Bromberg present the status of the blood Wassermann test in 500 cases of clinical neurosyphilis with positive spinal fluids. In the entire group of all clinical types of neurosyphilis, 155 (31 per cent) showed negative blood Wassermann tests early in their study. Twenty-one patients showed a one plus blood Wassermann test, 62 patients showed two plus, 42 patients showed three plus and 220 patients showed a four plus blood Wassermann test. In 297 cases of asymptomatic neurosyphilis, 101 patients showed a negative blood Wassermann test. In 133 cases of tabes dorsalis, 37 patients showed a negative blood Wassermann test. In 38 cases of dementia paralytica, 8 patients showed a negative blood Wassermann test. In 19

cases of dementia paralytica with tabes, 5 patients showed a negative blood Wassermann test. In 13 cases of meningovascular neurosyphilis, 4 patients showed a negative blood Wassermann test. The Kahn test was positive in 38 cases showing a negative blood Wassermann reaction. If this number of cases is deducted from the 155 showing a negative blood Wassermann reaction, there remain 117 patients with both the Kahn and Wassermann tests of the blood negative. The investigation shows that no case of syphilis, after the early stage, can be regarded as completely studied, accurately diagnosed or correctly treated without knowledge of the cerebrospinal fluid observations.

Eosinophilia in Syphilis.—Spangler made a comparative study of the differential leukocyte counts in 100 men having positive and 100 men with negative blood Wassermann reactions. The study of differential blood counts in patients with positive Wassermann reactions tends to indicate that a moderate eosinophilia occurs and is discoverable, if repeated counts are made at various stages of the patient's response to the specific toxin of the parasite of syphilis, in at least 40 per cent or more of the cases. It seems reasonable to assume, therefore, that the eosinophilia occurring in syphilis may be regarded as distinct evidence of the blood's reaction to the sensitizing (toxic) substance of Spirochaeta pallida and that it is indicative of the patient's development of an allergic cellular mechanism of defense. With the hypothesis that eosinophilia is a criterion of allergy and with the finding of an eosinophilia in individuals with positive Wassermann reactions in various stages of syphilitic infection, the possible immunologic relation of allergy and syphilis would appear to justify careful study. With the admittedly high incidence of unrecognized syphilitic infection and the unknown basic factor of many allergic metabolic disturbances, any clue leading to a definite diagnosis and of possible aid in solving the mechanism involved in the systemic eosinophilogenic response would seem worthy of attention and investigation from an immunologic standpoint. It seems justifiable that a moderate degree of eosinophilia, especially when associated with a lymphocytosis, occurring even periodically in an apparently nonallergic person whose intestinal tract is free from ova and parasites, warrants the taking of Wassermann tests and the making of a persistent search for clinical evidence of syphilis.

Journal of Nervous and Mental Disease, New York

81: 373-488 (April) 1935

*Encephalomyelitis Disseminata Following Ascending Neuritis. R. H. Thompson, Philadelphia.—p. 373.
Epilepsy in Identical Twins: Presentation of Three Pairs of Twins. R. H. Guthrie, Palmer, Mass., and W. M. Lebowitz, Chelsea, Mass.—p. 388.
Conceptions and Misconceptions of the Analytic Method. Karen Horney, New York.—p. 399.
Congenital Multiple Arteriovenous Aneurysm Intracerebral and Extracerebral, with Psychologic Correlations: Case. G. V. N. Dearborn, New York.—p. 411.
Tendon Reflexes of the Foot. S. M. Weingrow, New York.—p. 416.

Encephalomyelitis Disseminata Following Ascending Neuritis.—Thompson reports a case in which persistent pain in the left deltoid region began two weeks after the apparent recovery of a purulent infection of the left index finger and hand and changed gradually to a paresthesia of numbness involving the entire left limb. This was indicative of an extension of the infection into the peripheral neural system. Coexisting numbness of the upper portion of the left side of the trunk was a manifestation of extension of the morbid condition farther than the periphery and was the first presumptive evidence of involvement of the spinal cord; i. e., the left posterior column in its outer portion, the fasciculus cuneatus. The further progress of the paresthesia coincided with the anatomic distribution of the fibers within the posterior column. The clinical course implied a progressive segmental invasion of the posterior column of the left side, ascending from the posterior roots of the spinal nerves for the neck and upper limb. The paresthesia of numbness, therefore, was of particular localizing value. It marks a lesion beginning in the peripheral portion of the left posterior column and gradually extending transversely inward to involve within approximately fifty-nine days the fibers from the thoracic and caudal end of the left side of the trunk and the left lower limb. At this time other symptoms of involvements of the left posterior column were noticed: incoordination of the left hand and uncertainty and weakness of the movements of the left lower limb. About six weeks later numbness was noted in the right foot, gradually extending into the leg and then into the thigh, where its progress stopped. That the myelitic process included to a slight degree the left pyramidal pathway is evidenced by the presence of weakness in the left limbs with increased reflex tendon activity and patella and ankle clonus. The sensory examinations revealed intactness of the functions of the spinothalamic pathways. The distribution of the atrophy and the absence of any indication of fibrillary twitching seem to imply that the left brachial and cervical plexuses were the determining cause. The first indication of intracranial neural involvement was the appearance of diplopia about six weeks following the onset of pain in the deltoid region, or eight weeks after the subsidence of the infection of the finger. It is still present and is due to weakness of the left external rectus muscle. Clinical and experimental evidence indicates that toxins or infections may pass through large areas of nervous tissue without causing pathologic changes. The process ascending in the perineural lymph spaces has two pathways for further propagation, the axis cylinders and the cerebrospinal fluid, and each avenue of possible distribution has many followers.

Medical Annals of District of Columbia, Washington

4: 93-118 (April) 1935

Stone in Urinary Tract: Remarks on Recent Contributions to Our Knowledge of the Etiology. H. A. Fowler, Washington.—p. 93.
*Relation of Frontal Lobes to Visceral Function. J. W. Watts, Philadelphia.—p. 99.
Gastro-Intestinal Disorders in the Psychoses. A. Simon, Washington.—p. 106.
Adrenal Rest Tumor: Report of Unusual Case. W. C. Stirling, Washington.—p. 111.

Relation of Frontal Lobes to Visceral Function.—Watts describes experiments that suggest an explanation of the long recognized visceral symptoms and signs associated with focal seizures in man, especially those which occur in the absence of increased intracranial pressure. He found that the removal of cortical influence by extirpation of both premotor areas results in increased peristalsis and in some instances in intussusception. Faradic stimulation of the premotor area and certain adjoining parts of the cerebral cortex initiates vigorous movements of all parts of the intestine. Evidence is given indicating that cortical representation for the gastro-intestinal tract contains both excitatory and inhibitory components. An epigastric aura and other visceral sensations associated with focal convulsive seizures or occurring independently usually are not so-called referred sensations but result from vigorous and, perhaps, abnormal gastro-intestinal movements. Morbid hunger, associated with brain tumors, cerebral vascular disease and accidental injury to the brain, is probably due to irritation or destruction of the intestinal representation in the cortex or of tracts arising there. Evidence is presented indicating that incontinence of urine and other forms of bladder dysfunction in patients with brain tumor are probably the result of a disturbance of bladder representation in certain parts of the brain or of tracts descending from them.

Medical Bull. of Veterans' Adm., Washington, D. C.

11: 285-376 (April) 1935

Responsibilities of Medical Staffs. C. W. Hughes.—p. 285.
Heart Disease in Ex-Members of Military Forces: Survey of Six Hundred and Eleven Autopsies. P. B. Matz.—p. 288.
Sporotrichosis. J. C. Herrick.—p. 295.
Review of One Thousand Electrocardiograms. H. F. Machlan and O. O. Williams.—p. 299.
The T Wave of Low Amplitude. J. Dauksys.—p. 303.
Simulated Unilateral Blindness. W. D. Lightfoot.—p. 309.
Hallucination as True Sensory Phenomenon. L. M. Brown.—p. 312.
Analysis of Symptoms in Neurasthenia. T. M. Barrett.—p. 318.
Neurologic Changes in Hysteria. W. P. Moore.—p. 326.
Cerebral Abscess and Intrathoracic Suppuration. F. B. DeWitt.—p. 328.
Chronic Subdural Hemorrhage. C. R. Miller.—p. 332.
Brain Abscess Consequent to Latent Head Trauma. A. P. Smith.—p. 337.
The Problem in Malignancy. V. L. Minehart.—p. 342.
Details in Denture Construction. J. C. Endler.—p. 344.

New England Journal of Medicine, Boston

212: 647-704 (April 11) 1935

*Traumatic and Hemorrhagic Shock, Experimental and Clinical Study. G. K. Coonse, P. S. Foisie, H. F. Robertson and O. E. Aufranc, Boston.—p. 647.
Separation of Substances in Liver Which Are Reticulocytogenic in the Guinea-Pig and Which Are Therapeutically Effective in Experimental Canine Black Tongue. Y. Subbarow, B. M. Jacobson and C. H. Fiske, Boston.—p. 663.
Ovarian Cyst with Twisted Pedicle in Girl of Nine Years of Age. C. J. Kickham, Boston.—p. 665.
Survey of Tonsillectomy and Adenoidectomy in Scarlet Fever. G. P. Hunt, Pittsfield, Mass.—p. 665.
Acute Appendicitis in Children: Challenge of Its Continuing High Mortality. H. W. Hudson Jr., Boston.—p. 670.
Purulent Infections of Hip Joint: Analysis of Sixty Cases. F. A. Slowick, Pittsfield, Mass.—p. 672.

Traumatic and Hemorrhagic Shock.—Coonse and his co-workers differentiate traumatic from hemorrhagic shock. Traumatic shock is characterized by increasing acidosis and concentration of the blood (a relative increase of cells over serum as measured by hematocrit determination): in acute hemorrhagic shock, acidosis does not develop (the blood may show dilution with relative increase of serum over cells) and the effects are entirely due to loss of circulating blood volume. In slow hemorrhage, the changes more nearly resemble those of traumatic shock. Such cases usually show depression of the higher centers, increasing tissue anoxemia and acidosis. Blood volume loss in both instances plays a significant part. The effectiveness of the peripheral circulation is steadily diminished as the blood volume decreases. Interference with the function of the vital centers rapidly ensues. Depression of the respiratory center decreases the chest and abdominal excursions, resulting in a diminution of the normal negative intrapleural pressure. The return of blood to the heart is diminished as blood collects in the abdominal viscera and large venous radicles and smaller peripheral vessels. The diminished oxygen exchange in the periphery resulting from the altered mechanics of the circulation tends to create a vicious cycle of increasing anoxemic acidosis, the vital centers becoming still further depressed. The depressant and toxic effects of laked blood and traumatized muscle on the higher centers have been demonstrated in the experimental animal. Hemolysis has been shown to be consistently present in traumatic shock. Acute hemorrhagic shock is best treated by replacement of the lost volume with whole blood. Less severe cases respond satisfactorily to intravenous saline solution, dextrose or acacia and require no other treatment. Traumatic or slow hemorrhagic shock is best treated by intravenous alkaline solution or its combination with whole blood. Even severe cases of traumatic shock respond well to intravenous alkaline solution, if given in sufficient quantities over a suitable period of time. Such alkaline solutions not only prevent acidosis but serve as direct cell stimulants to the respiratory and other vital centers. Alkali increases the rate of dissociation of oxyhemoglobin and improves the peripheral blood flow. In certain cases, supplementary inhalations of carbon dioxide and oxygen may be indicated for both mechanical and chemical effects.

212: 705-750 (April 18) 1935

*Noncalculous Obstructions at Ureteropelvic Juncture. C. Y. Bidgood and D. J. Roberts, Hartford, Conn.—p. 705.
Braxton Hicks Version. F. C. Irving, Boston.—p. 718.
Clinical Evaluation of Positive Skin Reaction in Asthma, Urticaria, Vasomotor Rhinitis and Seasonal Hay Fever. A. Colmes, Boston.—p. 725.
Fracture of Coracoid Process of Scapula. W. P. Coues, Brookline, Mass.—p. 727.

212: 751-812 (April 25) 1935

Renal Infections. G. G. Smith, Boston.—p. 751.
Transplantation of Uninjured Tumor Cells. Olive Gates and S. Warren, Boston.—p. 759.
Dietary Management of Diabetics at the Diabetic Clinic of Infants' and Children's Hospitals, Boston, Mass. A. M. Butler, Boston.—p. 760.
Physiology, Pathology and Treatment of Craniocerebral Injuries. W. M. Craig, Rochester, Minn.—p. 777.

Noncalculous Obstructions at Ureteropelvic Juncture.—Bidgood and Roberts state that, because a kidney shows no evidence of function as tested by dye secretion, it cannot be said that it is irreparably damaged. Simultaneous bilateral urine urea determinations are of use in doubtful cases. An accurate test of kidney reserve as an index of its recuperative ability is desirable but is not available at present. Pelvic injections at operation are of assistance in demonstrating whether or not all factors tending to obstruct have been removed, and, unless every such impediment is removed, failure will often occur. The Rammstedt type of operation for fibrous narrowing of the ureteral lumen presents several advantages over the Heineke-Mikulicz principle. It does not entail the opening of the urinary tract, there is no limit to the length that the incision may be made, and there is no danger of puckering the opposite wall of the ureter. Pelvic infection will often subside spontaneously if free drainage is obtained. Clinical and functional improvement is often more satisfactory than the roentgenologic, in that the dilatation of the pelvis often persists. It is possible that, if a pelvis is dilated sufficiently over a period of time, it loses its muscular tone and will not contract to the usual normal size, even though it is draining well and is dynamically satisfactory. Before any operative procedure is attempted, coned down interval pyelographs of the ureteropelvic junction to determine the emptying time of the pelvis are of value, particularly when used in comparison with a similar study made after such a plastic or other operative procedure. Excretion urography may be an aid in determining the emptying ability of a pelvis, but only when a solitary kidney is present or one acting as such. The postoperative degree of dilatation of the kidney pelvis or calices as noted in a pyelogram is not an accurate criterion of the functioning capacity of the kidney.

New Jersey Medical Society Journal, Trenton

32: 119-182 (March) 1935

Meningitis from Petrous Apex and Sphenoidal Basis. W. P. Eagleton, Newark.—p. 125.
Evaluation of Various Procedures of Diphtheria Immunization: Résumé of Their Advantages and Disadvantages. H. L. Fuerstman, Newark.—p. 126.
Contagiousness of Acute Respiratory Infections in Children from Rhinologic Point of View. W. J. Greenfield, Hackensack.—p. 131.
Diagnostic Value of Optic Neuritis and Choked Disk in Nervous and Mental Diseases. A. Liva, Hackensack.—p. 136.
Diseases of External Ear. C. N. Dezer, Hackensack.—p. 139.
The New Jersey Medical Society Organizes to Improve Community Health Services. L. A. Wilkes, Trenton.—p. 144.
Industry's Contribution to the Cost of Medical Care: Plan for Public Distribution of Medical Service at Reasonable Rates. F. H. Glazebrook, Morristown.—p. 148.

Philippine Journal of Science, Manila

55: 297-402 (Dec.) 1934. Partial Index

Habitats of Philippine Anopheles Larvae. P. F. Russell, New York, and F. E. Baisas, Manila.—p. 297.
Practical Illustrated Key to Larvae of Philippine Anopheles. P. F. Russell, New York, and F. E. Baisas, Manila.—p. 307.

Radiology, Syracuse, N. Y.

24: 391-520 (April) 1935

*Roentgen Diagnosis of Chronic Arthritis. H. P. Doub, Detroit.—p. 391.
Surgery as an Adjunct to Treatment of Arthritis. W. C. Campbell, Memphis, Tenn.—p. 398.
Relative Value of Radiotherapy, Physical Therapy and Hyperpyrexia in Treatment of Arthritic Disturbances. J. C. King, Memphis, Tenn.—p. 411.
Medical Aspects of Chronic Arthritis. R. A. Kinsella, St. Louis.—p. 413.
*Congenital Lung Cysts in Infants and Children. S. G. Schenck and J. L. Stein, Brooklyn.—p. 420.
Graphic Method for Obtaining Area of Heart Shadow in Roentgen-Ray Study of Heart Disease. E. M. Van Buskirk, Fort Wayne, Ind.—p. 433.
Changes in Susceptibility of Drosophila Eggs to X-Rays: II. Correlation of Biologic Activity and Radiosensitivity. P. S. Henshaw, New York.—p. 438.
Pulmonary Metastasis: Pathologic, Clinical, Roentgenologic Study Based on Seventy-Eight Cases Seen at Necropsy. J. T. Farrell Jr., Philadelphia.—p. 444.
Diagnosis of Primary Carcinoma of Lung. C. H. Heacock and J. C. King, Memphis, Tenn.—p. 452.
Roentgen Consideration of Mediastinal Tumors. W. A. Evans and E. R. Witwer, Detroit.—p. 463.
Extrapulmonary Tumors of Thorax. C. B. Peirce, Ann Arbor, Mich.—p. 467.
Congenital Cyst of Lung. J. L. Dubrow, Des Moines, Iowa.—p. 480.

Roentgen Diagnosis of Chronic Arthritis.—Doub states that osteoporosis is one of the prominent roentgen signs of atrophic arthritis; in hypertrophic arthritis, eburnation or increased density is usually present. The density of the bones is even greater than that usually seen in normal bones of this

age period, as some grade of osteoporosis is usually seen after middle age. Both show evidence of cartilage destruction with narrowing of the joint space, but this process is more pronounced and occurs earlier in atrophic arthritis. Bone proliferation in atrophic arthritis is usually followed by ankylosis of the joint, while in the hypertrophic form marginal lipping is one of the characteristic early roentgen signs and may not indicate the presence of any symptoms at that time. Ankylosis is an infrequent occurrence in hypertrophic arthritis, although extensive bone production may be present about the joints. Mixed types of arthritis are seen frequently. In some cases it is difficult to distinguish between the two types from pathologic specimens, either by gross or by microscopic examination. Some of the pathologic and roentgenologic changes seen at certain stages of chronic arthritis are quite similar to those seen in other types of arthritis. Tuberculous and atrophic arthritis have some points of similarity. Osteoporosis is a definite characteristic of each at certain stages, cartilage destruction is common to the two, focal areas of bone erosion may occur in each, and pannus formation may be present over the cartilage. Osteoporosis in tuberculous arthritis is likely to be quite intense so that the articular surfaces are seen with difficulty and show a blurred appearance, greater than is usually seen in atrophic arthritis, and suggests that there is an osteolytic agent present. Hemophiliac arthritis may present roentgen signs that are similar to those of chronic arthritis. In mild cases there is effusion into the joint space, thickening of the joint capsule and lipping similar to that seen in hypertrophic arthritis. In a more advanced group, cartilaginous destruction is found. This may be local or may involve the entire cartilaginous surface of the joint. There is also bone destruction of punched out areas in the epiphysis, with an intact articular surface due to hemorrhage into the epiphysis, and generalized destruction of the articular surfaces. In some cases the blood clot in the synovial cavity becomes organized and shows calcification; when this occurs, it is pathognomonic of hemophiliac arthritis. The roentgen changes in gout may simulate those of chronic arthritis and are well defined rounded areas of destruction in the ends of the bones at the margins of the articular surfaces. There also may be destruction of the articular cartilage and erosion of the articular surfaces of the bones. There is usually not much osteoporosis present. In some of the milder cases there is lipping round the articular surfaces similar to that seen in hypertrophic arthritis. When the larger joints are involved the changes often suggest hypertrophic arthritis, but in these cases roentgenograms of the hands and feet may show the characteristic punched out areas of bone destruction and afford a clue to the etiology of the disease.

Congenital Lung Cysts in Children.—Schenck and Stein point out that, although the etiology of congenital cysts of the lungs is still obscure, the opinion prevails that it is a congenital malformation or developmental error, which results in a dilatation of the terminal bronchiole filled with a tenacious glairy fluid. If the cyst communicates with an adjacent bronchiole, this fluid is replaced by air and may remain stationary in size, provided the communication is patent during both phases of respiration. If the air is allowed to enter the cystic cavity and the communicating channel collapses or is closed off during the expiratory phase, the cyst enlarges or balloons, thereby producing severe attacks of dyspnea and cyanosis, which often terminate in death. A similar mechanism obtains in the case of multiple or honeycombed cysts. The diagnosis is made chiefly from a complete roentgenologic survey, and the condition must be differentiated from general or localized pneumothorax, lung abscess, encapsulated fluid, pneumonia, solid tumors and acquired cystic disease, such as bronchiectasia, echinococcic cyst and hydatid cyst. The prognosis is grave, especially in infants, and only four are known to have made a complete spontaneous recovery. No specific treatment can be offered, although the opinion is expressed that surgical removal will some day be a feasible procedure. The authors cite a case in an infant in which the cyst ruptured into a neighboring bronchus, evacuating its fluid contents, which were replaced by air. Subsequently, the walls of the cyst collapsed and were absorbed, and the infant made a complete recovery.

Public Health Reports, Washington, D. C.

50: 503-536 (April 12) 1935

Age Incidence of Illness and Death Considered in Broad Disease Groups: Based on Records for Nine Thousand White Families in Eighteen States Visited Periodically for Twelve Months, 1928 to 1931. S. D. Collins.—p. 507.

Rhode Island Medical Journal, Providence

18: 51-64 (April) 1935

County Health Units. M. W. Thewlis, Wakefield.—p. 51.
New Economic Problems for the Lying-In Hospital. H. P. B. Jordan, Providence.—p. 54.

South Carolina Medical Assn. Journal, Greenville

31: 69-94 (April) 1935

Clinical and Pathologic Consideration of More Common Lesions of the Breast. W. L. A. Wellbrock, Rochester, Minn.—p. 76.
Gleanings from One Hundred and Forty-Six Cesarean Sections. W. C. Hearin, Greenville.—p. 83.

Southern Surgeon, Atlanta, Ga.

4: 85-148 (April) 1935

The Relation of the Heart to Surgery. S. R. Roberts, Atlanta, Ga.—p. 85.
*Gritti-Stokes Amputation for Gangrene of Leg. J. W. Snyder, Miami, Fla.—p. 101.
Unusual Cancers of the Breast. D. Lewis and C. F. Geschickter, Baltimore.—p. 112.
Ether Intraperitoneally in Appendiceal Abscess. R. B. McKnight, Charlotte, N. C.—p. 121.
Tetany Following Thyroidectomy: Report of Two Cases with Four Years' Observation. B. H. Clifton, Atlanta, Ga.—p. 131.

Gritti-Stokes Amputation for Gangrene of Leg.—Snyder performed the Gritti-Stokes type of amputation in seven cases of gangrene of the leg. Some reason attends this type of procedure in that the larger muscle bodies of the thigh are left undisturbed with no incision across their structures and no disturbance of their circulation. The nutrient artery to the femur enters at a higher level from the profunda femoris and, as division of the femur just above the condyles does not open the marrow cavity of the bone, reasonable assurance of the integrity of the femur may be felt. Sloughing of the stumps of the hamstring muscles is of minor importance; the main question is the viability of the flaps and the patella itself. Apparently the rather free anastomosis about the patella is sufficient to maintain its nutrition and in no case has enough necrosis of the flaps ensued to give concern. In most of these operations the tourniquet has not been applied because of fear of producing damage to the circulation in the thigh. It has not been necessary to secure the patella to the femur with screws or nails, as the tension of the quadriceps acting against the patella seems to hold the patella firmly against the femur. Reinforcing sutures are employed. If union of the patella to the femur fails to occur, the stump will not be a success from the mechanical standpoint; but this has not happened in the author's series. He does not present these cases with the thought that this type of operation will always be a success, but the operation is much less severe on the patient than a midthigh amputation and produces little if any shock when done under a spinal anesthesia. If successful, it gives the patient a far more satisfactory stump.

Tennessee State Medical Assn. Journal, Nashville

28: 137-174 (April) 1935

Some Observations Concerning Problems of Medicine in Tennessee. J. O. Manier, Nashville.—p. 137.
Will America Copy Germany's Mistakes? Results of Half a Century's Practice of Social Insurance in the Land of Its Inception: German Labor Economist Offers New Plan to Avoid Pitfalls of Old One. G. Hartz.—p. 146.

Texas State Journal of Medicine, Fort Worth

30: 741-814 (April) 1935

Corpus Luteum Extract in Treatment of Abortion. F. B. Smith and R. A. Johnston, Houston.—p. 748.
Dystocia, Fetal and Maternal. T. F. Bunkley, Temple.—p. 751.
Essential Dysmenorrhea. W. M. Bailey, Tyler.—p. 755.
Urinary Antiseptics and Conditions That Favor Their Action. A. G. Cowles, San Antonio.—p. 759.
Fundamental Principles of Plastic Surgery of Face. J. F. Ford, Dallas.—p. 761.
Double Contrast Enema. R. P. O'Bannon, Fort Worth.—p. 763.
Malaria Diagnosis. C. P. Coogle, Houston.—p. 768.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Brain, London

58: 1-140 (March) 1935

*Studies in Neurologic Mechanism of Parathyroid Tetany. R. West. —p. 1.
Localization of Sleep Mechanism. S. N. Rowe.—p. 21.
Cerebral Blood Flow During Sleep in Man. F. A. Gibbs, E. L. Gibbs and W. G. Lennox.—p. 44.
"Syndrome of Premotor Cortex" (Fulton) and Definition of Terms "Premotor" and "Motor": Consideration of Jackson's View on Cortical Representation of Movements. F. M. R. Walshe.—p. 49.
Disorders of Motor Function Following Ablation of Part of "Leg Area" of Cortex in Man. F. M. R. Walshe.—p. 81.
Diabetes Insipidus. J. H. Biggart.—p. 86.
*Familial Degeneration of Cerebellum in Association with Epilepsy: Report of Two Cases, One with Pathologic Findings. F. T. Thorpe. —p. 97.
*Frontal Lobe in Man: Clinical Study of Maximal Removals. W. Penfield and J. Evans.—p. 115.

Neurologic Mechanism of Parathyroid Tetany.—West observed (on dogs) that the essential feature of tetany appears to be the action of a circulatory factor peripherally on some site in the muscle to cause repeated contractions of individual muscle fibers and electrical hyperexcitability. Both this fibrillary tetany and the electrical hyperexcitability are influenced by the nerve supply from the central nervous system. Given the integrity of the spinal reflex arc, the muscular contractions are synthesized into the characteristic forms of "tonic" and "clonic" tetany. In the presence of only the motor supply from the spinal cord the contractions remain fibrillary in type, but electrical hyperexcitability persists. Complete denervation leads to a continuation of fibrillary tetany and an increased electrical excitability with the onset of tetany. This probably corresponds to a phase of early degeneration at some point of action within the muscle, which maintains its irritability to the circulatory factor of tetany and increases the normal effect of the latter on direct electrical excitability. Subsequent degenerative changes lead successively to the loss of the fibrillary response to the circulatory factor and the institution of a peculiar electrical excitability of degeneration which is independent of tetany. If this interpretation is correct, parathyroid tetany arises essentially from the action of a changed circulation on the muscles. The point of action depends on an intact motor nerve supply for its function and undergoes successive changes of threshold on denervation. An intact spinal reflex is required to convert essential or fibrillary tetany into its elaborate clonic and tonic forms. Impulses from nervous centers higher than the spinal cord are not requisite to these forms of canine tetany.

Familial Degeneration of Cerebellum in Association with Epilepsy.—Thorpe describes a familial form of primary parenchymatous atrophy of the cerebellar cortex, in which two brothers, at the ages of 41 and 37 respectively, developed a progressive ataxia of the legs and arms and a slow drawling speech. The anatomic basis of the symptoms was ascertained in one of them after a duration of five years and was found to be a pure cortical type of cerebellar atrophy. The cerebellum was reduced in size by approximately one fourth and showed a generalized symmetrical atrophy with marked emphasis on the upper and anterior surface, especially the superior vermis and quadrilateral lobes. Histologically the essential lesion was a diffuse destruction of the cells of Purkinje. This particular type of atrophy has heretofore been described only in nonfamilial cases, unless one includes the Holmes family of four cases, of which the only one in which histologic examination was made showed an olivocerebellar atrophy. Familial degeneration of the cerebellum occurs more often in males, and the onset is between the ages of 32 and 41, whereas nonfamilial forms tend to occur at a much later age. Both forms are assumed to be due to an endogenous degenerative process or abiotrophy, but in the sporadic cases there may be an additional exogenous infective or toxic factor. The frequent combination of cerebellar atrophy and lesions of the spinal cord is mentioned, and in the case described a developmental defect of the cord was found, which suggests a latent association with Friedreich's disease. The two patients described were subject to epileptic seizures, which had been present for thirty-eight and eighteen years before the onset of cerebellar ataxia. The cerebellar lesion, however, was not the focal ischemic type which Spielmeyer finds in most epileptic brains but a gross generalized atrophy typical of the primary degenerations. The association of cerebellar atrophy and epilepsy in the two cases is regarded as accidental and merely represents the not uncommon occurrence of a predisposition to two independent nervous disorders in one individual.

Amputations of Frontal Lobe in Man.—Penfield and Evans describe three cases of tumor in which an infiltrating neoplasm has made it advisable to resect a large block of the frontal lobe. The patients suffered from chronic epilepsy due to a focal lesion of such a type and situation that lobe amputation offered the only hope of relief from the seizures. It was found that large amputations of the frontal lobe, if the precentral gyrus is left intact, produce surprisingly little disturbance of function that can be detected by ordinary methods of examination. There is no disturbance of the control of micturition, no forced grasping, no alteration of tone of the extremities or in the activity of deep or superficial reflexes. In the second case the operative removal affected only the middle third of the left frontal lobe, as the anterior third had already been destroyed by the traumatic injury, if one may arbitrarily so divide the lobe. This removal of the middle third in a right-handed man produced a partial loss of his capacity for mental arithmetic. The patient also had an unexplained absence of dizziness and pastpointing after rotation and caloric tests, even though vestibular function was otherwise normal. Detailed studies of sensation showed only changes within the limits of normal spontaneous variation. There was decreased appreciation of figures written on the palm of the contralateral hand, which may perhaps be related to the difficulty that the patient noted in the visualization of figures in "mental arithmetic." The removal of approximately the anterior half or two fifths of the right frontal lobe in the third case was not associated with any detected alteration, neurologic or psychologic. The two larger removals, the first two cases, present certain important defects in common and the authors consider these removals to have begun at the time of the origin of the initial lesion and merely to have become complete at the time of operation. Neurologically each was normal. By the ordinary psychometric tests each would have to be judged normal, although neither would rank very high. Each patient was lacking in initiative. Each was good natured and cooperative. Insight and capacity for introspection were preserved. Capacity to follow instruction was unimpaired, but initiative and capacity for planned action were clearly defective. This was especially true of the first patient, a woman of 43, in whom the right frontal lobe was extirpated. She had become incapable of discerning for herself possible courses of action so that she might choose. If others presented to her the possibilities she made up her mind quite easily, and when a task lay before her there was no reluctance or hesitation in undertaking it. So far as final conclusions from the first two cases are justifiable, it may be stated that maximal amputation of the right or left frontal lobe has for its most important detectable sequel impairment of those mental processes which are prerequisite to planned initiative.

British Journal of Radiology, London

8: 201-264 (April) 1935

*Excretion Urography: Based on Three Hundred and Eighty-Five Cases Investigated in a Large General Hospital. I. B. Barclay and J. B. Baird.—p. 201.
Electrical Characteristics of Constant High Voltage Generators for X-Ray Work: Part II. Practical Observations on Half-Wave Generators. G. E. Bell.—p. 218.
X-Ray Appearances Produced by Congenital Cystic Dilatation of Common Bile Duct. A. D. Wright.—p. 227.
Supplementary Note on Biologic Response to Gamma Rays of Radium as Function of Intensity of Radiation. F. G. Spear and L. G. Grimmett.—p. 231.
Radiography of Fine Flaws in Metals. A. G. Warren.—p. 235.
*Primary Carcinoma of Bronchus: Massive Involvement of Heart and Pericardium. N. M. Matheson.—p. 248.
Experimental Realization of International Roentgen Unit. W. H. Love. —p. 252.

Excretion Urography.—On the basis of 385 consecutive cases Barclay and Baird show that intravenous urography is a reliable, useful and safe method of investigation not only in the elucidation of essentially urologic conditions but also in

absolving the urinary tract in many cases presenting suggestive urologic symptoms. Contrasting intravenous urography with retrograde pyelography as a means of outlining the urinary tract, they state that the instrumental method gives an anatomic picture of the pelvis and calices by artificially distending them to an unknown degree, while the excretion urogram definitely outlines the shape and size of these cavities with physiologic accuracy. It follows, therefore, that the functional activity and the dynamics of the tract are well visualized, in addition to the anatomy as seen by the retrograde procedure. At least three roentgenograms should be taken at intervals of three, ten and thirty minutes after the injection of the dye and should be compared in order to justify accurate interpretation. Early tuberculosis in the kidney frequently gives characteristic appearances; e. g., "fringing" or bulbous deformation of the calix, together with a tortuous elongation of the stem. Undue retention of the dye in the roentgenogram taken thirty minutes after the injection or later strongly suggests infection or possibly an oxaluria or phosphaturia. Some idea of the functional recovery of the kidney can be obtained by urography at intervals of months after operation; e. g., removal of a ureteral calculus.

Primary Carcinoma of Bronchus.—Matheson reports a case of primary carcinoma of the bronchus in which roentgen examination revealed an enormous enlargement of the pericardium. Paracentesis pericardii, with the withdrawal of hemorrhagic fluid, gave temporary relief. At necropsy the chest was almost completely occupied by a rounded and greatly distended pericardial sac, which pressed the lungs into the upper and outer parts of the thoracic cavity. The heart appeared largely obscured by carcinomatous deposits extending over most of the anterior surface with the exception of a somewhat triangular area of the left ventricle. The myocardium was invaded from without by a growth that involved the outer half of the wall of the right auricle and the outer third of the right ventricular wall. The left auricle and left ventricle showed epicardial deposits with no appreciable extension into the cardiac muscle. Great enlargement of the tracheobronchial lymph nodes was observed, and chains of diseased glands extended in front of the vertebral column to become continuous with those glands which had been detected clinically on the left side of the neck. Just distal to the subdivision of the right bronchus was a tumor about 2 inches in diameter, extending chiefly into the adjacent tissue of the lung and adherent to the pericardium at the site where the interior of the pericardial cavity was most extensively diseased. The general characters of this growth were those of a bronchogenic carcinoma. Secondary metastases or tuberculous lesions in the parenchyma or visceral pleura were not observed. A solitary nodule the size of a walnut was found in the left deltoid. The bronchial tumor proved to be a squamous cell carcinoma. The nodule in the deltoid appeared to be a true metastasis.

Journal of Mental Science, London

81: 1-280 (Jan.) 1935

Study of Changes in Function Found in Schizophrenic Thought Disorder. K. Zucker and W. H. de B. Hubert.—p. 1.
*Action of Certain Drugs in Schizophrenia. H. C. Beccle.—p. 46.
Objective Measurement of Mental Stability. W. Line, J. D. M. Griffin and G. W. Anderson.—p. 61.
Studies in Experimental Psychiatry: V. W and F Factors in Relation to Traits of Personality. L. Grace Studman.—p. 107.
Perseveration. K. H. Rogers.—p. 138.
Perseveration and Personality. K. H. Rogers.—p. 145.
Id.: Some Experiments and a Hypothesis. R. B. Cattell.—p. 151.
Investigation into After-Histories of Discharged Mental Patients. L. H. Wootton and R. W. Armstrong, assisted by Dorothy Lilley.—p. 168.
Blood Bromine in the Psychoses. T. J. Hennelly and E. D. Yates.—p. 173.

Action of Drugs in Schizophrenia.—Beccle treated thirteen cases of schizophrenia with a combination of gonadal hormones and yohimbine. Of the nine male patients so treated, seven were discharged as recovered or greatly improved, one improved to the extent that he is now a useful hospital citizen, and one showed no response to the treatment. Of four female cases investigated, recovery occurred in three and one patient was definitely made worse. Gonadal extracts appear to be valuable therapeutic agents in the schizophrenic group of psychoses, with particular emphasis on the female follicular hormone. It is possible that, in spite of the absence of over indications of sex gland hypoplasia, such a condition may be present and hence may be an important factor in the preparation of the soil for a schizophrenic psychosis. The higher relative recovery rate in the female cases may be purely coincidental or, more probably, may be due to the fact that in estrogenic material there is a substance of known potency and chemical composition, whereas testicular extracts are variable in their activities. Yohimbine acts as a general central nervous tonic, has a specific influence on the genital apparatus, and appears to enhance synergically the action of the gonad hormones. No untoward symptoms were observed after the administration of these preparations, either orally or by subcutaneous or intramuscular injection. The blood phosphorus level appears to be distinctly higher in cases of schizophrenia than in the normal person, improvement in the mental condition being followed by a fall in this level (the inorganic fraction being used as an index). This index appears to be of value in controlling the treatment.

Lancet, London

1: 723-790 (March 30) 1935

Clinical Science Within the University. T. Lewis.—p. 723.
The Evolution of Mind: II. J. S. Bolton.—p. 728.
*Asphyxia Neonatorum: Its Treatment by Tracheal Intubation. J. B. Blaikley and G. F. Gibberd.—p. 736.
Osteomalacia in Great Britain: Record of Four Cases. E. Bulmer.—p. 740.
Influence of Avertin on Renal Function. N. E. Pitt.—p. 741.

Asphyxia Neonatorum.—Blaikley and Gibberd use a modification of Howarth's Chevalier Jackson's pharyngoscope in the treatment of asphyxia neonatorum by tracheal intubation. The upper respiratory passages having been cleared of mucus, the baby is held with its head overhanging the table on which it lies. The pharyngoscope is introduced over the tongue, to the base of the tongue. The cords are usually relaxed and offer no resistance to the passage of Magill's silk web endotracheal catheter, which should be slightly moistened with olive oil. The rest of the apparatus consists of a device for delivering a carbon dioxide-oxygen mixture at a known and easily variable pressure. The whole object of the insufflation is to ensure the primary unfolding of the atelectatic lung, and this requires a pressure in the bronchi equivalent to at least 15 cm. of water. As soon as the primary distention of the alveoli has been accomplished oxygenation of the blood rapidly occurs, so that the medullary center recovers its sensitivity and the flaccid laryngeal muscles recover their tone. Thus it is seldom necessary to leave the catheter in the trachea more than a few minutes; but, if cyanosis recurs subsequently, the operation should be repeated. During insufflation the infant should lie flat on its back at an angle of 15 degrees with the horizontal, head downward. The authors present two results. They have considered the possible dangers of a sudden obstruction to the outflow between the catheter and the larynx, but with the pressures recommended they do not believe that serious damage could occur. They believe that the margin of safety of pressure for forced ventilation by intratracheal insufflation under positive pressure is much greater than the margin of safety when negative pressures are used to expand the whole of the chest wall, as in a Drinker apparatus. The authors do not recommend this method of resuscitation in all cases of asphyxia neonatorum, but, when respiratory movements are not established quickly, or when, because of some mechanical obstruction in the larynx, trachea or bronchi, air is not drawn into the lungs, they believe that the method should be adopted. Other suitable cases are those in which a well developed infant has marked atelectasis and remains blue or has repeated attacks of cyanosis that do not become less frequent with the inhalation of a carbon dioxide and oxygen mixture given by means of a mask or nasal catheter. The proper mixture of gas to introduce into the lungs consists of 5 to 10 per cent carbon dioxide and 90 to 95 per cent oxygen. Pure carbon dioxide must be avoided as lethal if introduced unmixed into the lungs. The real need is for oxygen; the carbon dioxide merely ensures that this gas is not washed out of the blood to so low a level as no longer to be a stimulus to the respiratory center.

Journal de Chirurgie, Paris

45: 513-688 (April) 1935

Technic of Phrenicectomy with Investigation of Accessory Phrenic and Subclavicular Nerve. H. Fruchaud and M. Thalheimer.—p. 513.
*Hydatid Cysts of Spleen. L. Sabadin.—p. 534.
Crushing of One Tuberosity of Tibia. L. Sechehaye.—p. 561.

Hydatid Cysts of Spleen.—Sabadin reports two cases of hydatid cyst of the spleen and discusses the condition in detail. From the anatomic point of view there are two varieties: the abdominal and the thoracic. The characteristic clinical features are the insidious onset, the prolonged evolution of the cysts, the existence of a cystic tumor, a symptomatology sometimes abdominal, sometimes thoracic, and the frequency of complications. From the therapeutic point of view he discusses the advantages of marsupialization either abdominal or transthoracic. This fits with established surgical principles, since it is simple and rapid, aims directly at the evacuation of the cyst and avoids serious postoperative risks.

Paris Médical

1: 281-316 (April 6) 1935

Digestive Pathology in 1935: Annual Review. P. Carnot and H. Gaehlinger.—p. 281.
Rectal Localizations of Nicolas-Favre Disease. B. Cunéo.—p. 294.
Silent or Almost Silent Gastropathies and Their Importance in General Pathology. P. Chevallier.—p. 300.
*Treatment of Ulcerative Rectocolitis by Vitamin A. J. Rachet and A. Busson.—p. 308.
Hyperchylic Erythremia. P. Carnot, J. Caroli and M. Coppo.—p. 312.

Vitamin A Treatment of Ulcerative Colitis.—Rachet and Busson used carotene in a solution of deoxygenated olive oil for local application in cases of ulcerative rectocolitis. This method, they believe, is particularly adapted to the localization of the vitamin A factor. Four patients were treated in this manner. Favorable results were definite and could be divided into improvement of the general, the functional and the local anatomic condition. They conclude that this treatment is a definite forward step.

Schweizerische medizinische Wochenschrift, Basel

65: 353-372 (April 20) 1935

*Granulocytopenia, with Especial Consideration of Causal Significance of Amidopyrine and Similar Preparations. I. D. Stein.—p. 353.
Apical Pleural Empyema During Childhood. J. R. Dreyfus.—p. 357.
Replacement of Faradic Current in Electrodiagnosis and Therapy by Chronaxia Apparatus with High Frequency Contact Breaker. K. M. Walthard.—p. 360.
Examination of Work Metabolism of Muscle in Situ by Means of Electricity. A. von Muralt.—p. 362.
*Nitrites in Urine and Their Importance for Diagnosis of Urinary Infections with Bacillus Coli. E. Jaeggy and W. Lanz.—p. 363.

Granulocytopenia.—Stein thinks that granulocytopenia is not so much a disease entity as a pathologic reaction to certain irritants. He differentiates three groups of such irritants. Those belonging to the first group, benzene, radium rays and roentgen rays, regularly impair the leukopoietic system. To the second group of irritants belong the toxins of typhoid, measles, influenza and sepsis. These toxins attack the leukopoietic system peripherally as well as centrally. The third group of irritants are certain chemical preparations, such as amidopyrine, which, however, prove harmful only in persons who have a hypersensitivity. The author thinks that amidopyrine and its derivatives are the cause of many cases of agranulocytosis that formerly were considered as cryptogenic or idiopathic. He emphasizes that, if the physician prescribes such preparations, he should be aware of the fact that there are patients who are hypersensitive to these substances. Thus it is necessary to exercise the same precaution in prescribing amidopyrine and the related preparations as in prescribing arsphenamine and narcotics. The author regards the administration of pentnucleotide and repeated blood transfusions as the best therapeutic measures during the beginning stage. Later, roentgenotherapy may be applied to the long bones and liver therapy may be tried. All medicaments, with the exception of those that stimulate the leukopoietic system, should be discontinued during the acute stage, for it cannot be foretold how a person's blood system will react to a certain medicament.

Nitrites in Urine.—Jaeggy and Lanz demonstrate that the presence of nitrites in the urine is a definite proof of a urinary infection, particularly an infection with Bacillus coli. They describe a simple chemical reaction that will aid the practitioner in the diagnosis. As reagent they use a powder in the preparation of which 6.2 Gm. of a-naphthylamine is mixed with 1 Gm. of sulphanilic acid and this mixture is combined with 25 Gm. of pulverized citric acid. The moist substance thus obtained is dried in the air or in the desiccator. After drying, it is once more pulverized. This powder, white or light pink, is five times more sensitive than the reagent suggested by Griess and it has the added advantage that it is stable. It reveals the presence of nitrites in a concentration of 1:5,000,000.

Policlinico, Rome

42: 805-856 (April 29) 1935. Practical Section

*Direct Medical Treatment of Duodenal Ulcer and of Pain Symptoms of Duodenum. G. Sabatini.—p. 805.
From Cervical Sympathectomy to Total Thyroidectomy in Treatment of Angina Pectoris. A. Chiasserini.—p. 813.
Mediastinal Abscess: Rare Case. G. Fontana.—p. 818.
Distinctive Characteristics of Vitamin C. E. Pittarelli and M. Pittarelli.—p. 826.

Medical Treatment of Duodenal Ulcer.—Sabatini places the patient on a milk diet for from three to five days. He prescribes six portions of milk (2 liters) daily, one portion every three hours from 8 a. m. to 11 p. m. To the first, third and fifth portion is added a level teaspoonful of barium sulphate. The patient does not take any other liquid or solid food during the treatment, abstains from all medicaments and does not remain in bed. After the treatment the return to a normal diet must be gradual, increasing in food values and in amounts every day. During this period of alimentary repair the author occasionally administers an alkaline mixture composed of bismuth subcarbonate 1, magnesium carbonate 0.3, pepsin hydrochloride acid 0.3 and dry extract of belladonna 0.1 in a capsule. Patients show more tolerance for barium sulphate than for bismuth compounds. The majority of patients were rapidly relieved of pain and of the clinical symptoms of ulcer. The author obtained good results in acute forms of duodenal ulcer and in nonulcerous duodenal syndromes. Barium treatment was not successful in patients presenting advanced changes in the duodenum, callous and deforming ulcers and considerable thickening of the duodenal walls. Good results were obtained in duodenitis and periduodenitis accompanying cholelithiasis. Treatment was found especially valuable during the acute seasonal stages of duodenal ulcer (spring and fall).

Siglo Médico, Madrid

95: 473-500 (April 27) 1935. Partial Index

Professional Eczema. J. M. Tome Bona.—p. 478.
*Treatment of Hemoptysis by Subcutaneous Emphysema. N. González de Vega and D. Castilla Pérez.—p. 485.

Treatment of Hemoptysis by Subcutaneous Emphysema.—González de Vega and Castilla Pérez report satisfactory results from the production of a subcutaneous emphysema in the inferior half of the thorax, by means of subcutaneous injections of air, in the treatment of tuberculous hemoptysis. The injections in their cases were given in amounts varying from 200 to 300 cc. of air and performed at the posterior axillary line at the level of the eighth, tenth or eleventh ribs. The authors used a pneumothoracic apparatus, but identical results are obtainable from the use of a Potain insufflating pump or of a large syringe. The method is simple in its technic, efficient in its results and harmless. The only necessary precaution is to inject the air in the inferior half of the thorax in order to prevent the formation of either mediastinal or cervical emphysema. The four patients treated by the authors were suffering from pulmonary tuberculosis of either exudative or dense fibrous type. The subcutaneous injections of air were the only treatment given to two patients, those who were seen by the authors shortly after the appearance of hemoptysis. The remaining two were seen by the authors one and three days, respectively, after the appearance of the hemorrhage. They had been given during those days a hemostatic preparation without any favorable effect. In all four cases the hemoptysis was checked immediately after the injection of air or a few hours later.

Archiv für Verdauungs-Krankheiten, Berlin

57: 113-224 (March) 1935. Partial Index

*Value of Diets with Extreme Variations in Protein and Fat in Treatment of Diabetes Mellitus. W. von Drigalski.—p. 113.
Oxalic Acid Metabolism in Patients with Renal Disease. R. Rittmann and P. Unterrichter.—p. 120.
*Action of Substances Produced by Roasting of Foods on Gastric Secretion. W. Heupke.—p. 149.
Endogenic and Exogenic Factors in Pathogenesis of Gastric Ulcer. K. Warncke.—p. 156.
*Influence of Aminoacetic Acid on Creatinuria in Exophthalmic Goiter. W. Gros.—p. 177.

Extreme Variations in Protein and Fat in Diet in Diabetes Mellitus.—In order to determine whether, besides insulin and the usual dietary measures, there are other possibilities that permit a modification of the diabetic metabolism, von Drigalski kept eleven patients with severe or average diabetes mellitus under observation for about eighty days. For sixty days the patients received the usual dietary treatment and after that were given for twenty days diets containing an abundance of proteins or a restricted amount of proteins. The author did not observe any therapeutic effect during this phase of treatment, and in one case he observed an exacerbation. This contradicts the results obtained by other investigators, but he thinks that this contradiction is due to the fact that the other investigators instituted those diets during the first phase of treatment, and he believes that the efficacy of the diets at that time is the result of the strict diet as such. Once the improved tolerance has reached a state of rest and the metabolic condition a certain constancy, the diets with extreme variations are no longer effective. Nevertheless, these diets may prove of practical value in patients who get tired of one diet. The change to another diet keeps the patient in metabolic equilibrium. Moreover, a diet with a high protein content appeases the appetite readily and thus is of value in the treatment of polyphage diabetic patients. However, protein sensitivity should be watched for.

Action of Products of Roasting on Gastric Secretion.—Heupke points out that the flavors produced by roasting are found in a variety of foods. He investigated the gastric secretion following the intake of roasted and unroasted coffee, of roasted and boiled meats and of other foods. He never observed an increase in the acidity values traceable to the roasting substances alone. In several instances it appeared that the hydrochloric acid secretion was reduced, but in the majority of cases there was no noticeable modification, and the author concludes that the roasting products influence the acid secretion only slightly or not at all. Nevertheless, it cannot be denied that the roasting products do exert certain physiologic actions. Maier was able to show that they increase mental alertness. They also reduce fatigue and prostration and counteract the sensation of hunger. Thus the roasting products influence the nervous system, particularly the sensory nerves. Except for a slight increase in the peristalsis, they have only a slight effect on the motor nerves.

Influence of Aminoacetic Acid on Creatinuria in Goiter.—Gros points out that the creatinuria existing in certain forms of myopathy has been influenced by the administration of aminoacetic acid. Since there are a number of disturbances (among them exophthalmic goiter) in which an impairment of the muscles is not evident but in which creatinuria exists nevertheless, the author decided to investigate the effect of aminoacetic acid on the creatinuria of these conditions. He made his studies on nine patients with exophthalmic goiter. The daily elimination in the urine of creatine and of creatinine was determined. In accordance with former tests, a reduction in the creatinine content of the urine and a more or less severe creatinuria was observed in all cases. Following the administration of aminoacetic acid the creatinuria increased by 100 per cent or more. The author concludes that in disorders with different clinical aspects there may exist a syndrome of disturbances in the muscle metabolism, which is probably caused by similar anatomic and functional disturbances. The aminoacetic acid medication did not exert any influence on the basal metabolism of the patients with exophthalmic goiter.

Deutsche medizinische Wochenschrift, Leipzig

61: 613-652 (April 19) 1935. Partial Index

Fatigue, Sleep and Rest. L. R. Muller.—p. 613.
*Hearing and Speech Disturbances. H. Loebell.—p. 619.
*Inguinal Sterilization. Menge and F. Schultze-Rhonhof.—p. 621.
Inflammation of Optic Nerve and Choked Disk, Particularly as Regards the Early and Erroneous Diagnoses. Heine.—p. 624.

Hearing and Speech Disturbances.—Loebell shows that severe impairment of hearing is the cause of some forms of stammering and particularly of lisping. This was clearly demonstrated in cases of sigmatism. The author thinks that the hearing capacity should be examined in patients with speech defects and, if necessary, the ear should be treated. The prognosis of certain forms of stammering is largely dependent on the ear defect; that is, it is favorable or unfavorable to the extent to which the defect in hearing can be improved. The author illustrates this with a case of vowel stammering with interdental sigmatism and a case of stammering with tachylalia.

Inguinal Sterilization.—Menge and Schultze-Rhonhof state that inguinal sterilization with extraperitonealization and suturing of the partially resected uterine tubes into the inguinal canals was first suggested by Menge in 1899. They think that it is the only surgical method for the sterilization of women that has never failed. Their observation covers 107 cases. In some of these women the operation dates back twenty-six years and in others only two years. In all women who could be reached (ninety-three in all) the operation had resulted in permanent sterility. The authors emphasize that only Menge's original method insures against failure and that its modifications, like all other methods of sterilization, have been known to fail at times. They consider the "extended Alexander-Adams operation" an effective method to insure the permanent extraperitonealization of the uterine tubes in the inguinal canals. They further emphasize that Menge's operation never causes difficulties, for all intraperitoneal complications, such as peritonitis and adhesions, are obviated, and there is no danger of ileus, a complication that has been known to follow other methods of sterilization. Other advantages of Menge's operation are that its technic is simple, that it can be completed in a short time and that it can frequently be performed under local anesthesia. The authors advise that the extraperitonealization and suturing of the resected tubes should be preceded by a forward drawing of the round ligaments (up to their proximal end) from the opened peritoneal cone. If this has been done, it is unnecessary to exert traction on the delicate and soft tubal tissue. Exact knowledge of the topography of the external inguinal ring and of the entire inguinal canal is highly important for the success of the operation. The method has the disadvantage that it cannot be used in case of extensive adhesions in the small pelvis with retrofixation of the uterus. However, this disadvantage is of slight practical importance, because such women, as a rule, are already sterile. Moreover, thin membranous adhesions in the small pelvis can generally be detached from the inguinal canal by the digital method.

Jahrbuch für Kinderheilkunde, Berlin

144: 191-254 (April) 1935

Some Cases of Rare, Nondiphtheric Respiratory Stenoses. H. Zischinsky.—p. 191.
*Plasma Phosphatase in Normal and Rachitic Children. O. Andersen.—p. 206.
Causal Organism of Impetigo Contagiosa Albo-Staphylogenes (Dohi). H. Asano.—p. 222.
Experimental Studies on Enteral Sodium Chloride Fever. A. Kálló and G. Török.—p. 226.
Hormonotherapy of Atrophy in Nurslings. P. Roboz.—p. 240.

Plasma Phosphatase in Normal and Rachitic Children.—Andersen reviews former studies on plasma phosphatase and describes his own investigations. In children without signs of bone disease he found that in children up to 3 years of age the average value is 0.25 unit and the marginal values are 0.14 and 0.34 unit, and in children between the ages of 3 and 13 years the average value is 0.15 unit and the marginal values are 0.06 and 0.26 unit. In twenty-one children with rickets (aged between 3 and 27 months) he found the average plasma phosphatase value to be 0.86 unit and the marginal values 0.42 and 1.41 units. He concludes that phosphatase values under

0.3 unit are not increased, that values between 0.3 and 0.4 unit may be increased and that values in excess of 0.4 unit are definitely increased. Thus 0.3 unit may be regarded as the lowest limit of pathologic values. The author observed also that antirachitic treatment produces a reduction in the plasma phosphatase in children with rickets, so that normal values are reached. The reduction in the phosphatase is slower than the increase in the calcium and phosphorus values, and it appears that the phosphatase values adhered more closely to the clinical improvement. There seems to be no direct connection between the absolute phosphatase and calcium values; however, there is a certain relationship between the phosphorus and the plasma phosphatase values, so that in case of low phosphorus values there are, as a rule, high phosphatase values and vice versa. The severity of rickets seems to have no influence on the absolute phosphatase values. In severe cases of rickets there may be high as well as comparatively low values of phosphatase. The author assumes that an increase in the phosphatase without the simultaneous existence of the clinical signs of rickets may indicate a latent D avitaminosis. Moreover, he thinks that the determination of the plasma phosphatase may perhaps prove helpful in detecting the optimal dose of vitamin D in the treatment of rickets.

Klinische Wochenschrift, Berlin

14: 521-552 (April 13) 1935. Partial Index

Biologic Significance of Heavy Hydrogen. W. Brandt.—p. 521.
*Nycturia and Gastric Ulcer. A. Jores and H. Beck.—p. 526.
Diuretic Action of Organic Mercury Compounds. H. U. Simmert.—p. 530.
*Gonadotropic Factors of Urine During Menopause. A. Lipschütz.—p. 532.
Abnormal Quantities of Nitrogen (N_2) in Blood of Patient with Pulmonary Emphysema. G. Leiner.—p. 535.

Nycturia and Gastric Ulcer.—Jores and Beck maintain that the quantitative relationship of day and night urine is not the result of night rest and sleep but that the normal restriction of the elimination of urine during the night is a definitely established rhythm, conditioned by mechanism in the central nervous system. That this is so was proved in tests on persons who worked during the night. Observations on these persons indicated that neither sleep nor the lack of fluid intake is the cause for the nocturnal limitation of the secretion of urine, but that hormonervous mechanisms, rhythmic processes, are the determining factors. The authors cite investigators who observed inversion of this normal type of water elimination. The inversion of the normal type is especially frequent in cardiac and renal diseases accompanied by disturbances in the water exchange. Other conditions in which the nocturnal inhibition of diuresis has been found absent and a nycturia present are cerebral syphilis, narcolepsy, epilepsy and emaciation. After the authors accidentally observed nycturia in patients with gastric and duodenal ulcer, they decided to study the relations between these two conditions. Tests on thirty-one patients in whom the diagnosis of ulcer had been corroborated by roentgenoscopy disclosed the presence of nycturia in twenty-two; in seven others the nocturnal quantity amounted to more than two thirds of the total daily quantity, and in the remaining two the elimination of the urine was normal. Control tests on twenty-four patients with various disorders disclosed only two patients with nycturia. The authors reach the conclusion that ulcer and nycturia are two distinct manifestations of a disturbance in the hypophyseodiencephalic system. In view of the localization of the center of the water exchange in the diencephalon, the authors call attention to Cushing's observation of the occurrence of intestinal ulcers in case of tumors in that region of the brain, and to the experimental development of gastric ulcers following the injection of large doses of hypophyseal extracts, observed by other investigators. After citing two other interesting cases, the authors express the opinion that nycturia is a noteworthy symptom of intestinal ulcers that developed on a nervous basis.

Gonadotropic Factors of Urine During Menopause.—Lipschütz calls attention to a report by Anselmino and Hoffmann in which those authors proved that Evans's "synergistic" gonadotropic factor of the anterior lobe of the hypophysis appears also in the urine of castrates and of women in the menopause, and then he discusses his own studies on this problem. He cites his comparative experiments on guinea-pigs and rats with the gonadotropic principle of the anterior lobe of the hypophysis. These tests indicated that the so-called synergistic factor of the anterior hypophysis, which appears also in the urine of menopausal women, is identical with the follicle-sensitizing factor. The estrogenic factor should be differentiated from it. Moreover, he thinks that the complete gonadotropic complex probably contains three water soluble hormones; namely, the estrogenic, the follicle-sensitizing and the luteinizing factors.

Medizinische Klinik, Berlin

31: 501-536 (April 18) 1935. Partial Index

Benign Mixed Tumor of Parotid Gland Chiefly with Intra-Oral Localization. B. Breitner.—p. 510.
*Dilation of Tracheal and Bronchial Stenoses with Laminaria Pencils. K. Amersbach.—p. 511.
*Diagnosis of Tumors of Carotid Gland. V. Schmieden and L. Mahler.—p. 513.
Behavior of Body Temperature Following Operations Under Local Anesthesia. E. Hunold and H. Loebell.—p. 514.
*Life Saving Action of Ovarian Preparations in Severe Hemorrhages in Patient with Hemophilia. K. Franke and S. Litzner.—p. 520.

Dilation of Bronchial Stenosis by Laminaria Pencils.—Amersbach shows that the expansible laminaria pencil can be employed for the dilation of bronchial stenoses. This dilation makes it possible to enter the bronchi with wider tubes and it also facilitates the manipulation of instruments in the bronchi. The inclusion of an iron core in the laminaria pencil allows roentgenologic localization of the pencil. The author shows that this is especially helpful in determining the localization of the pencil relative to the foreign body that is to be extracted. He thinks that the laminaria pencil will prove helpful likewise in the dilation of tracheal stenoses.

Diagnosis of Tumors of Carotid Gland.—Schmieden and Mahler review the literature and list the following points, which Klose mentioned in 1922 in connection with two cases observed in Schmieden's clinic, as a basis for the diagnosis of tumors of the carotid gland: (1) it is localized at the bifurcation of the common carotid artery; (2) laterally the tumor can be moved readily, but vertically it is impossible to move it; (3) it is oval, its surface has flat humps and it is of a firm, elastic consistence; (4) there is expansive pulsation with systolic sounds, but both disappear on compression of the common carotid artery; (5) there are protrusion of the pharyngeal wall and paralysis of the vocal cords; (6) the pupil on the diseased side is contracted in some cases; (7) the growth is slow; (8) palpation of the tumor is painless. Other reports have appeared and all authors agree that the diagnosis of tumors of the carotid gland is difficult. Occasionally a tumor of the carotid gland is discovered, when the disorder has been diagnosed as something else, and, on the other hand, tumors in the bifurcation of the common carotid artery have been found to be of different origin. The authors think that, if the foregoing symptoms are observed in case of a tumor in the region of the cervical triangle at the level of the carotid bifurcation, a tumor of the carotid gland should be thought of. Probability diagnoses that are often made are aneurysm, lymphoma, lymphosarcoma, aberrant struma, cyst of the bronchial canal, branchiogenic carcinoma, Hodgkin's disease or cold abscess. The fact that cases of bilateral tumors of the carotid have been observed and that they occur even in infants and small children is another factor that makes the diagnosis more difficult. The question of the malignant condition of the carotid tumors has not been definitely answered as yet.

Action of Ovarian Preparations in Hemophilia.—Franke and Litzner report the history of a boy, aged 12, who since the third year of his life suffered from severe hemorrhages. Extravasations developed in various joints and later renal hemorrhages set in. The boy had been treated for several years with hemostyptic tablets containing vitamins A, B, C and D and calcium phosphate. During the severe renal hemorrhages he was given not only this vitamin preparation but other hemostyptics. In an especially severe renal hemorrhage, all these preparations proved ineffective. The boy's life was in danger, and it was decided to try an ovarian hormone preparation. The patient was given an intravenous injection of 1,000

units and after one hour he complained of drawing pains in the region of the right kidney. Then colic developed and the urine contained clotted blood. On the following day the injection was repeated and was again followed by colic and by the evacuation of blood clots and normally colored urine. After that there was no recurrence of the renal hemorrhage and another injection three days later caused no pains. Coagulation time and bleeding time were now greatly reduced. The blood status, hemoglobin content and erythrocytes improved rapidly under the influence of iron therapy. The authors are investigating whether the oral administration of ovarian hormone preparations is suitable for the continuous treatment of patients with hemophilia.

Wiener Archiv für innere Medizin, Vienna

26: 321-480 (April 8) 1935. Partial Index

*Physiology and Pathology of Bilirubinemia. K. Fellinger and R. Pfleger. —p. 321.
Symptomatology and Early Diagnosis of Syphilis of Aorta. H. Schlesinger.—p. 341.
*Barbituric Acid and Thyroid. I. von Zárday and P. Weiner.—p. 353.
Problem of Eosinophilia. H. Krasso.—p. 363.
*Demonstration of Tubercle Bacilli in Gastric Irrigation Fluid of Children. E. Hacker and K. Wallis.—p. 379.

Physiology and Pathology of Bilirubinemia.—Fellinger and Pfleger studied the behavior of serobilirubin in healthy persons as well as in a large number of patients with various disorders. The bilirubin content of the serum was determined while the persons were fasting, during starvation and following the intake of food. The authors found that during starvation the serobilirubin is always increased in healthy persons as well as in those who are ill. The increase develops rather slowly and does not exceed certain maximal values. Following the intake of food, the bilirubin values show a noticeable reduction. The lowest values are not reached until several hours after the meal. It was demonstrated on a large number of patients that persons with high initial values of serobilirubin show the most pronounced fluctuations. However, patients with certain hepatic disturbances are an exception to this rule. The authors think that impairment of the liver cells by hunger, rhythmic changes in the function of the liver and a connection of the serobilirubin fluctuations with the bile secretion help to explain the described observations. Theoretical reasoning and experiments indicate a causal connection between serobilirubin and bile secretion.

Barbituric Acid and Thyroid.—On the basis of observations on patients and of animal experiments, von Zárday and Weiner conclude that there is an antagonism between the hormone of the thyroid and the barbituric acid preparations, which does not include other soporifics. The cause of this elective antagonism is the fact that both the barbituric acid preparations and thyroxine have their point of attack in the cells of the diencephalon. Because of this antagonism, patients with thyrotoxicosis as well as persons with a hyperthyroid-sympathicotonic constitution require larger doses of barbituric acid preparations to go to sleep than do other persons. In order to determine the correct dosage, it is advisable to give attention to the somatic and psychic signs that permit detection of the neurohormone status of the patient.

Tubercle Bacilli in Gastric Irrigation Fluid of Children.—Hacker and Wallis point out that demonstration of tubercle bacilli in the sputum is rather difficult in young children because they swallow rather than expectorate the sputum. For this reason, investigators have resorted to examination of the fluid obtained by gastric lavage. The authors examined the gastric irrigation fluid of fifty children for the presence of tubercle bacilli by means of the animal experiment. The time elapsed between the injection of the infective material and the manifestation of the pathologic process varied between sixteen and seventy-six days, the average length being forty days. The experiments revealed that fifteen of the total number of fifty children had an "open" tuberculosis. It was found also that younger children have a positive bacillary test much more often than the older children. However, the greater frequency of the positive tests is not so much the result of the lesser age as such but is rather due to the fact that during this age primary lesions are more frequent, which in turn results in a greater tendency of this age group to open forms of tuberculosis.

Wiener klinische Wochenschrift, Vienna

48: 481-512 (April 19) 1935. Partial Index

*Hormone Properties of Pineal Body. P. Engel.—p. 481.
Therapeutic Value and Action Mechanism of Gold Preparations, with Especial Consideration of Some Chronic Infectious Diseases (Scleroma, Actinomycosis, Filariasis). E. Neuber.—p. 486.
*Paravertebral Injection of Alcohol in Angina Pectoris and Other Pain Conditions. F. Mandl.—p. 490.
Hypertension of Traumatic Origin: Case. A. Weissmann.—p. 494.
*Action of High Tension Electric Current (Alternating Current of from 1,000 to 3,000 Volts) at a Frequency of 50 Cycles on Normal and Alcoholized Rabbits. E. O. Manoiloff.—p. 495.

Hormone Properties of Pineal Body.—Engel says that some investigators consider the pineal body an endocrine gland while others deny its endocrine function. He describes studies on the influence of pineal extracts on sexual development, the sex hormones, the gonadotropic hormones of the anterior lobe of the hypophysis and the growth of tumors. He calls attention to the toxic actions of the pineal extracts. A survey of the various actions of the pineal body discloses, in addition to a somewhat indistinct action on the processes of cornification and on the growth process, an inhibiting effect on two important hormones of the anterior lobe of the hypophysis; namely, the hormone effecting maturation of the follicle and the hormone producing luteinization. He describes a test for the demonstration of the antigonadotropic hormone of the pineal body and reports his studies on the hormone content of the pineal glands of a number of persons of various age groups, who had died from various disorders. He found that from 29 to 40 rat units was the average antigonadotropic hormone content, but in two cases he found as high as 60 rat units. He studied the antigonadotropic hormone content of the blood and of various organs. These investigations indicated the organ specificity of the substance and its probable transportation by the blood. In discussing the chemical properties of the antigonadotropic substance of the pineal body, the author states that it can be extracted readily by alkaline-aqueous solutions from the dry acetone powder. Alcohol, ether or acetone extracts have always proved ineffective. The hormone is not thermostabile. Ultrafiltrates retain their antiluteinizing action but apparently not the action directed against the maturation of the follicle. In the course of acid extraction the greatest part of the efficacy is destroyed. The author thinks that the hormone of the pineal gland may eventually find clinical application.

Paravertebral Alcohol Injection in Angina Pectoris.—Mandl points out that paravertebral injection interrupts the rami communicantes and thus the pain conduction to the visceral organs. The injection of anesthetics proved helpful in surgical anesthesia and for differential diagnostic purposes. It seemed desirable to use a substance that would have a more lasting effect, and alcohol was chosen. The author employed the paravertebral alcohol injection in a large number of patients and stresses that the route of injection should be anesthetized and that the alcohol should be deposited from 0.5 to 1 cm. away from the vertebral column. He injects from 2 to 5 cc. of a 70 or 80 per cent alcohol solution. He enumerates the conditions in which paravertebral alcohol injection is advisable, giving especial attention to angina pectoris. He observed favorable effects of long duration in 50 per cent of the cases of angina pectoris, in 10 per cent of the gastric crises, in 90 per cent of the cases with severe pains in the region of the biliary tract and of the kidney, in 90 per cent of the cases with herpes zoster and in 75 per cent of the vasomotor disturbances. The method was ineffective in spondylarthritis. The author thinks that in disorders in which a surgical intervention may eventually be considered (angina pectoris) the paravertebral alcohol injection should always be tried first, the more so since its results are not much inferior to the surgical interventions on the sympathetic.

Action of High Tension Electric Current.—Manoiloff describes studies on rabbits, which demonstrated pathologic changes in the nerve cells of rabbits that had been influenced by alcohol. He found that the action of the high tension electric current results in fatality much oftener in alcoholized rabbits than in those that have not been treated with alcohol. He concludes that persons who work with the high tension electric current are always exposed to danger and should avoid the abuse of alcohol.

Zentralblatt für Gynäkologie, Leipzig

59: 849-912 (April 13) 1935. Partial Index

Spondylolisthesis. K. von Dittrich and S. Tapfer.—p. 950.
*Behavior and Clinical Significance of Gonadotropic Hormones in Chorionepithelioma Following Radiologic Treatment. W. Spitzer.—p. 859.
Necessity of Removing Adnexa in Operation of Carcinoma of Body of Uterus. E. Wallbruch.—p. 865.

Gonadotropic Hormones in Chorionepithelioma.—Spitzer points out that surgical manipulations may lead to metastasis of chorionepithelioma and that consequently radiologic therapy has been recommended by many authors. Assay of the content of gonadotropic substance in the urine in cases of chorionepithelioma and of cystic mole has been found valuable in diagnosis as well as in determining the efficacy of treatment. Most studies so far have been concerned with the change in content of gonadotropic substance following the surgical removal of chorionepithelioma and not with that following radiologic treatment. The author investigated the latter. A woman, aged 26, with vaginal chorionepithelioma was subjected to a combination radium and roentgen treatment. Reactions II and III of the Aschheim-Zondek test, which had previously been positive, became negative. This and the negative histologic results of a biopsy, which was done following the irradiations, indicate that the radiologic treatment effected cure.

Nederlandsch Tijdschrift voor Geneeskunde, Haarlem

79: 2035-2186 (May 4) 1935.

Intestinal Resection and Terminal Ileitis. H. T. Deelman.—p. 2042.
Senile Cataract in Tropics. A. W. Mulock Houwer.—p. 2055.
*Tropical Sprue, Pregnancy and Eczema. P. B. Van Steenis.—p. 2062.
Influence of Heat Irradiation on Permeability of Nose. H. A. E. Van Dishoeck.—p. 2073.
Investigation of Vitamin E Content of Vibeta, Alleged Vitamin E Concentrate. P. Schoorl.—p. 2086.

Tropical Sprue, Pregnancy and Eczema.—Van Steenis reports thirty-eight cases of sprue in women, thirty-three of whom were married and in the child-bearing period. Twelve of these occurred during pregnancy. Eight were primary cases of sprue during pregnancy and four recurrences of sprue preexisting during pregnancy. As a rule, the symptoms appeared after the sixth month. General recovery or marked improvement set in after delivery. The symptoms of sprue of pregnancy do not differ materially from those of other cases. As a complication in four of the twelve cases, eczema appeared during the seventh and eighth month respectively of pregnancy and ten days and two months respectively after delivery. In the first three patients it was generalized on the trunk, the extremities and the genitalia, and it subsided shortly after delivery. The author states in conclusion that eczema is not a common complication in sprue or in pregnancy.

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*Operative Treatment of Perforation of Ulcer. H. Schilling.—p. 249.
*Treatment and Prognosis of Hypernephroma. P. Bull.—p. 270.
Accessory Renal Vessels as Cause of Intermittent Hydronephrosis with Sharp Attacks of Pain. C. Johannessen.—p. 345.
Painful Congenital Subluxation of Hip. A. Øwre.—p. 369.
*Lipogranuloma: Foreign Body Inflammation Often Suggesting Tumor. H. F. Harbitz.—p. 401.
Traumatic Rupture of Hydronephrosis. K. Haugseth.—p. 451.

Operative Treatment of Perforated Ulcer.—Schilling reports 265 cases of perforated gastric and duodenal ulcers collected from the two surgical departments of the Ullevål Communal Hospital in Oslo and in which operation was performed between 1912 and 1934. The gastric ulcers made up two thirds and the duodenal ulcers one third of the material; including the latter, 80 per cent of the ulcers were located near the pylorus. The majority of perforations, 85 per cent, were found in men. A distinct increase in the number of perforations was noticeable in men, particularly in young men. There were seventy-one cases from 1912 to 1922 inclusive and 194 cases from 1923 on; the rate of perforations among women, on the other hand, was lower in the second period than in the first. The treatment was the same in the two departments. The operation was begun with an incision in the right iliac fossa; then suture of the perforation and as a rule gastro-enterostomy (in 79 per cent), lavage through both incisions and closure without drainage were performed. Ulcers located far from the pylorus and those in debilitated patients were treated by suture alone. The results were exceedingly good, the mortality rate being 2.8 per cent within the six-hour limit and 7.4 within the twelve-hour limit.

Treatment and Prognosis of Hypernephroma.—Bull reports thirty-seven cases of hypernephroma, twenty-one in men and sixteen in women, 73 per cent of the patients ranging in age from 40 to 59. One female patient was but 18. There were twenty-six nephrectomies with two deaths (7.7 per cent), one from uremia (ether anesthesia) and one from pulmonary embolism a few hours after the operation. There were twenty extraperitoneal and six transperitoneal nephrectomies. The justification of always commencing the operation with ligation of the renal vessels to prevent, if possible, mestastases is discussed. No satisfactory results were obtained by the use of roentgen and radium irradiation. Operation was performed on twenty-three patients more than three years ago; eleven of these, or 47.8 per cent, have lived for more than three years, but only five of these eleven are free from recurrence thirteen, twelve, eight, eight and three and one-half years after the operation, and two, free from recurrence after seven and four and one-half years, are dead; thus seven of the twenty-three, 30.4 per cent, are free from recurrence. Two died of recurrence after six and three-fourths and four years, and two are living with recurrence after three and five-sixths and twelve years. The patient with local recurrence after twelve years had a large cystic growth weighing 10.7 Kg. Thirteen nephrectomized patients, who subsequently died of their recurrences, lived from two and three-fourths months to six and three-fourths years, an average of at least two years after nephrectomy and at least three years from the first clinical symptoms. Ten nonnephrectomized patients lived from one to three and one-half years, or an average of two years from the first symptom. One patient with metastasis of the lymph nodes the size of a walnut is still living after thirteen years. All patients with thrombosis of the renal vein (five) have died of recurrences. Atypical hypernephroma gave a worse prognosis than the typical cases. One patient with metastasis of the femur was free from recurrence nearly two years after disarticulation of the femur.

Lipogranuloma.—Harbitz defines lipogranuloma as a special foreign body inflammation of the adipose tissue with characteristic granulation tissue and development of oil cysts lined with polynuclear cells or syncytia. These cysts are later transformed into serous cysts surrounded by acellular hyaline connective tissue, which may become calcified, or the cysts may obliterate to solid fibrous or calcified lumps with histologic resemblance to psammoma bodies. They have then a characteristic roentgenogram showing ring-shaped or solid small round calcifications most frequently situated in the subcutaneous fat tissue. The author's material consists of seventeen cases of lipogranuloma in the breast and nineteen cases in other localities. Many of the circumscribed lipogranulomas were removed on suggestion of a malignant tumor.

Hygiea, Stockholm

97: 257-288 (April 15) 1935

Volvulus Treated Operatively, with Recovery: Case. A. Rydén.—p. 257.
*Blood Picture and Sedimentation Reaction in Inflammatory Diseases of Eye: C'cn. H. Sjögren.—p. 262.

Blood Picture and Sedimentation Reaction in Inflammatory Diseases of Eye.—Sjögren made an examination of the blood in 200 cases of inflammatory disorders of the eye, 153 of endogenic and 47 of exogenic origin, and carried out the sedimentation reaction in 352 cases, 294 of the endogenic and 58 of the exogenic kind. He says that, while the sedimentation values were increased in about 50 per cent of the endogenic cases, shifting to the left occurred in only about 11 per cent, which agrees with the known fact that the latent chronic infections which are the chief etiologic factors in diseases of the eye are more surely reflected in the sedimentation reaction than in the hemogram. A definite relation between diseases of the eye on the one hand and the blood picture and the sedimentation reaction on the other cannot be confirmed. In about half the cases neither the eye disturbance nor the underlying focus in the body is expressed by certain pathologic changes in these reactions. The reactions afford no evidence for differential diagnosis and are of no prognostic significance.